

ENVIRONMENTAL AUDIT COMMITTEE

Fifth Report

**GMOs AND THE ENVIRONMENT:
COORDINATION OF GOVERNMENT POLICY**

Volume II

Minutes of Evidence
and Appendices

*Ordered by The House of Commons to be printed
11 May 1999*

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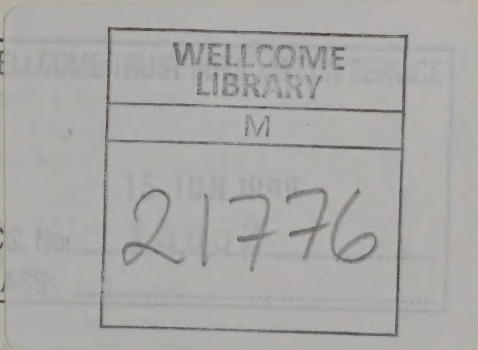
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The Environmental Audit Committee is appointed under Standing Order 152(A) to consider to what extent the policies and programmes of government departments and non-departmental public bodies contribute to environmental protection and sustainable development, to audit their performance against such targets as may be set for them by Her Majesty's Ministers; and to report thereon to the House.

The Committee consists of sixteen Members. It has a quorum of four. Unless the House otherwise orders, all Members nominated to the Committee continue to be members of it for the remainder of the Parliament.

The Committee has power:

- (a) to send for persons, papers and records, to sit notwithstanding any adjournment of the House, to adjourn from place to place, and to report from time to time;
- (b) to appoint specialist advisers to supply information which is not readily available or to elucidate matters of complexity within the committee's order of reference;
- (c) to communicate its evidence and any other documents relating to matters of common interest to any committee appointed by this House or by the Lords; and
- (d) to meet concurrently with any committee appointed under Standing Order No. 152 (Select committees related to government departments), or any sub-committee thereof, or with the European Scrutiny Committee or any sub-committee thereof, or with any committee appointed by the Lords, or any sub-committee thereof, for the purposes of deliberating or examining witnesses.

The membership of the Committee since first appointment on 12th November 1997.

Chairman: Mr John Horam

Mr Norman Baker
(appointed 2 December)
Mr Bob Blizzard
Mrs Helen Brinton
Mr Cynog Dafis
(appointed 17 November)
Mr Dominic Grieve
Dr Brian Iddon
Mr Tim Loughton
Rt Hon Michael Meacher
(appointed 19 December)*

Mr Laurence Robertson
Mr Malcolm Savidge
Mr Jonathan R. Shaw
Mr Matthew Taylor
(appointed 17 November,
discharged 2 December)
Mr Gareth R. Thomas
Mr Paul Truswell
Joan Walley

*The Minister for the Environment has ex-officio membership of the Committee in like manner to the Financial Secretary's membership of the Committee of Public Accounts.

The texts of Committee reports, evidence and press notices are available on the Internet (www.parliament.uk).

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TAKEN BEFORE THE ENVIRONMENTAL AUDIT COMMITTEE

THURSDAY 15 APRIL 1999

Present:

Mr John Horam, in the Chair

Mr Norman Baker
Mrs Helen Brinton
Dr Brian Iddon

Mr Malcolm Savidge
Mr Paul Truswell
Joan Walley

Memorandum submitted by English Nature, on behalf of the Statutory Nature Conservation Agencies

1. SUMMARY

1.1 This advice is restricted to the impacts of GM crops on wildlife; the conservation agencies have no locus on human health or safety (2.3).

1.2 The agencies are not fundamentally opposed to GMOs, but believe that a systematic and stepwise approach is needed if the potential benefits, rather than the damaging impacts, are to prevail (2.4).

1.3 The concern is with the effects on wildlife of the use of GM crops, including gene escape, impacts upon ecological food webs, and changes in husbandry, rather than the principle of genetic modification *per se* (2.5).

1.4 A UK strategy for assessing and managing the environmental implications of the release of GMOs is essential (3.1).

1.5 An over-arching body to provide guidance on generic and specific developments in non-human biotechnology is needed (3.2).

1.6 Potential environmental benefits should be assessed as part of a risk/benefit analysis within the regulatory process (3.4).

1.7 Research into the development of GMOs which could alleviate damage to wildlife in intensive farming systems should be encouraged (3.5).

1.8 The recent extension to the remit of ACRE, so that cumulative ecological effects can now be considered as part of the licensing process, is welcomed. This must include assessment of crop management regimes as well as gene introgression (4.4).

1.9 The creation of stronger links between ACRE and ACP should be considered (4.5, 4.9).

1.10 There should be on-farm regulation and monitoring of commercial GM crop management systems, comparable to those existing for pesticides (4.6).

1.11 The over-arching committee (see 1.5 and 3.2) should have a key role in influencing the direction of development of GMOs (4.8).

1.12 EU Directive 90/220/EC should be amended to allow Member States to take account of ecological and agricultural circumstances (including cumulative effects) when GM licence applications are considered, to bring the situation into line with the existing arrangements for pesticides licencing (4.10, 7.1, 7.3).

1.13 A wide discussion forum is needed, to consider the contribution that GMOs might make to more sustainable agriculture (4.11).

1.14 The conflict between GATT/WTB obligations and biodiversity obligations needs to be explored and assessed explicitly (7.4, 7.6).

1.15 The relationship between wildlife and agriculture in Europe is different to that in north America, and this needs to be taken into account in the GATT and WTA process (7.5).

1.16 There need to be clear and effective arrangements, including financial responsibilities, for dealing with civil liability for any environmental damage caused by GMOs (8.1).

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[Continued

2. OUR INTEREST IN THIS SUBJECT

2.1 English Nature is the statutory body responsible for advising both central and local Government on nature conservation, and for promoting the wildlife and natural features of England. In fulfilling its duties, English Nature:

- (a) advises Ministers on the development and implementation of policies for nature conservation;
- (b) advises Ministers on other policies affecting nature conservation;
- (c) identifies, notifies and safeguards Sites of Special Scientific Interest;
- (d) establishes, maintains and manages National Nature Reserves;
- (e) provides guidance and advice on the principles and practice of nature conservation to a wide constituency; and
- (f) commissions and supports a wide range of research and other projects.

2.2 Through the Joint Nature Conservation Committee (JNCC), English Nature works with equivalent organisations in Scotland, Wales and Northern Ireland. In common with these agencies—Scottish Natural Heritage, Countryside Council for Wales, and the Environment and Heritage Service (Northern Ireland)—English Nature is consulted by the DETR Biotechnology Unit on applications to release GMOs, including marketing applications from other member states. Most applications for releases of GMOs are in England. English Nature sits as an assessor on the Advisory Committee for Releases to the Environment (ACRE), and acts as lead agency for the British statutory nature conservation agencies. This evidence has been agreed by Scottish Natural Heritage, Countryside Council for Wales and the JNCC.

2.3 The conservation agencies have no locus on issues of human health or safety, and confine their advice to matters relating to the conservation of the wildlife and natural features in Great Britain. Accordingly, our comments are restricted to those parts of the advisory process which relate to where and how they are grown, and the effects this may have on biodiversity on land, in the soil, in freshwater, and in the sea.

2.4 The conservation agencies concerns with regard to potential impacts on biodiversity derive from responsibilities placed on us to conserve wildlife. The UK has international obligations to safeguard its native biodiversity, deriving from the EU Habitats and Species Directive, the EU Birds Directive, and the UN Convention on Biological Diversity. The latter has been converted into action in Britain through the Biodiversity Action Plan. In Britain, wildlife is often very closely associated with, and independent upon, agricultural systems, and is already being damaged significantly by agricultural intensification, with many once-common farmland species having declined by up to 70 per cent. over the past 30 years. We are not fundamentally opposed to GMOs, since they could have the potential to mitigate the environmental problems of intensive agriculture. We are, however, concerned that the current trend in GM crops is to develop traits that will allow even more intensive use of biocides (herbicides and insecticides). We believe there is a need for a more cautious approach, and more effective regulation of GMO releases, if the benefits rather than the potentially damaging impacts are to prevail.

2.5 It is the effects on wildlife of the use of GM crops that concern us, not the principle of genetic modification *per se*. The development of herbicide-tolerant and insect-resistant plants will allow changes in farming practice that are likely to lead to weed-free and insect-free fields. The most worrying change is the ability to use broad-spectrum herbicides throughout the growing season, which is not currently possible. The consequences of this for ecological food webs have not been assessed by ACRE or by applicants. We believe that this network of potential ecological impacts should be assessed carefully before commercial releases are allowed.

2.6 With regard to the specific questions posed by the Committee, our remit limits us to commenting on Questions 1, 2, 5 and 6.

3. QUESTION 1

Is there a need to develop a strategy for assessing and managing the environmental implications of the release of GMOs?

3.1 Given the potential for the different crop management practices which are used on genetically modified crops to have huge impacts on Britain's biodiversity, we believe it is essential that a strategy for assessing and managing the environmental implications of the release of GMOs is developed. The ability to use broad-spectrum herbicides on crops throughout the growing season represents a steep change in agricultural practice, which will affect ecological food webs within agricultural systems. For example, development of crops resistant to herbicide use during the growing season would allow herbicide regimes which removed virtually all weeds from the crop; these provide food and habitat for invertebrate animals (themselves often of wildlife importance), which are a vital part of the food chain for farmland birds. The use of such a herbicide regime is also likely to have effects

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[Continued

on adjacent areas such as conservation headlands and hedges. Given the importance attached to biodiversity issues in the UK, and the international commitments mentioned in paragraph 2.4 (above), the urgent need for a carefully considered strategy to assess the environmental effects of the use of GMOs is clearly apparent.

3.2 Whilst the regulatory system for the release of GMOs has recently been extended to encompass the environmental implications of their use, this does not provide a mechanism for addressing the strategic issues which arise. We believe there is an urgent need to put in place an overarching committee, as suggested by the Royal Society and the Parliamentary Office for Science and Technology, to provide broad advice on generic and specific developments in non-human biotechnology. This would span departmental responsibilities, monitor the enforcement of existing or future regulations, and strengthen the guidelines issued to growers of GM crops. In addition, it could provide a forum for discussion of general issues such as the role of GM crops in agriculture, and their effects on the rural environment. We suggest that its remit should include the following:

- (a) the provision of an independent scientific overview to Ministers on generic issues, which would help inform future specific cases. A broad overview of scenarios, such as the potential impact on the environment of genetic modification to native plants, is currently lacking. This would parallel the existing Human Genetics Advisory Commission and could include similar terms of reference, for example:

“To keep under review scientific progress at the frontiers of non-human genetic engineering and related fields. To report on issues arising from new developments in non-human genetic engineering that can be expected to have wider environmental, social, ethical or economic consequences, for example in relation to biodiversity, public health and consumer choice.”

- (b) where specific cases and implications are contentious, and the issues raised cut across Departmental boundaries, the body could provide Ministers with advice by examining evidence and views from all the relevant advisory committees.
- (c) the body could commission research and co-opt expertise where necessary to provide the best advice.
- (d) the body could liaise with analogous European fora containing representatives from statutory agencies. A Europe-wide system for information sharing and assessment of the likely effects of biotechnology needs to be established, especially since there appears to be wide variation within Europe in the interpretation of 90/220/EC.
- (e) the body would require members with broad knowledge and experience in the major areas—biodiversity and conservation; agriculture; food and human/animal health; biochemistry/biotechnology; and the retail and consumer industry. Like the Human Genetics Advisory Committee it would be important to include the chairs of the relevant advisory committees.

3.3 The committee should receive and assess information from DETR, the biotechnology industry, MAFF, DTI, Territorial Departments, and the statutory agencies, encouraging them to work together to present as broad a picture of the implications as possible. The Committee would also be able to identify gaps in knowledge, and recommend strategic research to address these. It could also indicate strategic direction to the biotechnology industry.

Should this strategy include the formal assessment of the environmental benefits of GMOs alongside their risks?

3.4 The overriding priority should be a stringent test of safety, in terms of toxicity and other directly damaging properties. However, if a product is deemed “safe” in these terms, there should then be a process of assessing the environmental risks against the potential benefits. It is important to note that “environmental benefits” have often been claimed for GMO use, but have never been demonstrated in terms of benefits for wildlife. For crops, there should be assessment of the effects on biodiversity of the proposed GM crop management system, compared with those arising from use of “conventional” non-GM crops. In many cases, existing intensive agriculture has already had significant damaging effects on wildlife, and this also needs to be mitigated. A risk/benefit analysis would enable better informed decisions to be made by ACRE.

3.5 We believe it might be possible to develop GMOs that could alleviate damage to wildlife in intensive farming systems, whilst maintaining or increasing yields. This could release more land for low intensity farming, as well as reducing direct impacts of intensive farming. Possible examples might include:

- (a) securing fungal resistance in adult plants by “switching on” resistance genes which are active in the seed coat, but not currently in adult plants. This could lead to a significant reduction in fungicide use, these chemicals being some of the most damaging used in agriculture;

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- (b) achieving insect resistance by altering the physical characteristics of plants, perhaps by increasing hairiness or thickening the plant cuticle. This could reduce insecticide use;
- (c) preventing outcrossing by engineering pollen incompatibility into crops, so that only plants of the same variety could be pollinated. This could significantly reduce the risk of spread of insect resistance or herbicide tolerance traits into native species.

3.6 Any such “beneficial” modification would need careful and full assessment of its effects on biodiversity, but we believe there is significant potential environmental advantage in encouraging the industry to focus effort in this direction.

4. QUESTION 2

Does the Government have adequate mechanisms for developing such a strategy, in terms of:

(a) Co-ordination of existing policy and strategy

4.1 In view of the number of regulatory committees involved in the environmental field, reporting to different Ministries (notably ACRE reporting to DETR, and the Advisory Committee on Pesticides (ACP) reporting to MAFF), we recommend that an overarching committee is put in place, as described in paragraph 3.2 above.

4.2 The provision of advice on the release of GMOs to the environment is the responsibility of the Advisory Committee on Releases to the Environment (ACRE), which deals both with controlled releases for research purposes, and with commercial release applications. Advice on the approval of pesticides, including any new pesticides developed to deal with specific genetically modified crops, is the responsibility of the Advisory Committee on Pesticides (ACP).

4.3 Until recently, the remit of ACRE did not include consideration of the potential ecological impacts of the release of GMOs, and was limited to assessing the possibility of direct effects on selected species, and on the possibility of gene transfer to related species. A case by case approach was taken to each application, with no consideration of cumulative effects on the ecological food web. This was a matter of serious concern to the conservation agencies, since we believed that such a narrow approach did not allow the implications for biodiversity to be properly assessed. None of the dependent effects seen within ecological food webs were assessed by ACRE.

4.4 However, the remit of ACRE has recently been extended to include consideration of these wider biodiversity impacts, and a working group has been established by ACRE to explore the scope of the issues that need to be addressed. We are pleased to see this action, and will be involved in the working group. We believe that ACRE’s remit must allow effective and thorough assessment of individual and cumulative ecological impacts, and that this must include consideration of crop management regimes as well as the effects of the genetic modification itself. We believe that applicants should be required to undertake all necessary research to provide ACRE with enough information to make a proper assessment of likely biodiversity effects. We have provided ACRE, and the Department of the Environment, Transport and the Regions, with advice on the generic research areas which need to be explored in order to provide the kind of information needed. (Annex 1). It is important that these issues are addressed urgently, given the pressures for commercial release. The research needs to be considered in a stepwise fashion, with enough time being allowed for results to be assimilated and analysed, and these results then used to identify what further work may be needed. The annual reproductive cycle of most organisms involved means that reliable results are unlikely to be gathered in less than two to three years.

4.5 The responsibility for approving new pesticides, including those designed specifically for use on GM crops, lies with the MAFF Pesticides Safety Directorate, advised by ACP. There would be merit in strengthening formal links between ACRE and ACP in circumstances where related products are involved, for example where specific herbicides are developed for particular new GM crops. There also needs to be consideration of how insect resistant GM crops are tested and monitored, given that they operate through the plants producing chemicals which are highly toxic to insects. Should such products be assessed by ACRE or ACP, and should they be regarded as pesticides for regulatory purposes?

4.6 At the on-farm level, we recommend that there should be statutory regulation and monitoring of GM crop management systems, unless and until there is clear evidence that such systems are viable, safe and acceptable in regard to their wildlife impacts. Statutory regulation already applies to the use of pesticides, and we believe that a similar approach is desirable for GM crop management.

4.7 We believe this is necessary to deal with the concerns raised by ACRE in their 1996–97 Annual Report, where they identified the need for minimum separation distances between crops with tolerance to different herbicides, to reduce the risk of hybridisation; and the need to ensure that GM herbicide tolerant crops are not grown in successive years on the same piece of land, which carries the risk of evolution of resistance in weeds.

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Whilst ACRE considered that these matters could be dealt with through a voluntary code, we can see no reason for treating GM crops any differently from the way pesticides are regulated, given that the impacts on wildlife could be equally severe. Current experience with voluntary codes is that they rarely work effectively and, given the potential impact of GM crop management systems on biodiversity, we believe it is too risky to rely on them as the means of avoiding potentially serious wildlife effects.

(b) *Oversight of, and influence over, the direction of development of GMOs*

4.8 There has been little, if any, direction given by Government to the development of GMOs, giving rise to an “anything goes” attitude within the biotechnology industry. This has led to significant investment into GMOs which have subsequently been shown to be risky in terms of their potential environmental effects. The inclusion of antibiotic markets in finished products is an example of where the system has failed to indicate to the industry which transformations are acceptable. We believe that the proposed overarching committee (as scoped in paragraph 3.2 above) should develop a strategic direction for Government, so that this technology can be focused towards providing wide benefits which take full account of environmental issues. This would include the production of codes of good practice for the development of GMOs. This latter process has already been started by ACRE, who have set up a subgroup to develop a code.

(c) *Assessment of direct and indirect risks, including the cumulative impact of GMO releases over time*

4.9 There are already some mechanisms in place to address these issues, mainly through the work of ACRE and ACP, but there needs to be better and closer communication between the two committees. Up to now, indirect effects, particularly on biodiversity, have not been assessed, but the recent changes to the remit of ACRE have greatly improved the situation.

4.10 However, the cumulative effects of releases are not dealt with directly by either committee, although it is implicit in the ACRE process. We recommend that the remit of ACRE should formally be extended to include the responsibility to review the impacts of cumulative releases. It is also desirable to include this within the amendment of 90/220/EC, so that it includes specific provisions to allow Competent Authorities to assess indirect threats to the environment.

(d) *The contribution that GMOs might make to more sustainable agriculture*

4.11 There is little discussion of this issue at present, largely because there is no forum in which it can be explored. The biotechnology industry appears to be interested in understanding an agenda for more sustainable agriculture, and how GMOs could play a part in the achievement of this. It is essential that biodiversity issues are seen as key considerations, and accorded high priority within the sustainable agriculture debate. A series of workshops, guided by a working group, could usefully start this process, perhaps as part of the proposed Stakeholder Forum.

5. QUESTION 3

What mechanisms exist, or are needed, for incorporating public values and concerns regarding the environmental implications of GMOs, alongside the results of scientific assessment, within the decision-making process?

5.1 We have no comments.

6. QUESTION 4

What is feasible and desirable in terms of preserving consumer choice by segregation and labelling—particularly the use of “labelling for process” to provide for customer influence over the use of GMOs and their environmental implications?

6.1 We have no comments.

7. QUESTION 5

What scope does the UK and EU have for policy initiatives, and what are the prospects for multi-lateral agreement, on the release of GMOs into that environment—with particular reference to the World Trade Organisation and GATT disciplines and obligations?

7.1 There is considerable opportunity for co-ordinated action at UK and EU level, through the current review of Directive 90/220/EC, which would enable environmental and biodiversity impacts to be given greater

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[Continued

prominence. We believe that, when deciding upon release applications, EU Member States should be able to take account of territorial, ecological and agricultural circumstances more easily. This will require more explicit enabling clauses in 90/220/EC.

7.2 Unilateral restriction of GMO releases to the environment at Member State level is perceived as a restriction on competition and free trade. Approval for release and marketing in the EU is given by a qualified majority vote among Member States. In effect, this means that a GM crop which receives marketing approval for use in southern Spain would have approval for marketing in Scotland, even though the ecosystems and farming practices were radically different, and there were no assessments of the effects on biodiversity in other parts of Europe.

7.3 For pesticides to be marketed, even though the active ingredient is approved for use at EC level, each product needs approval within each Member State, taking account of individual conditions of use, such as the ecosystems which the products may affect. We believe that the same principle should apply to GMO releases, enabling Member States to take account of individual ecological and agricultural circumstances.

7.4 With regard to the World Trade Organisation and GATT, there appear to be major discontinuities with environmental considerations, with apparent claims that freedom of trade is overriding. This clearly has the potential to conflict with international (such as the 1992 Rio Convention on Biological Diversity), and European wildlife commitments (such as the EU Habitats Directive and Birds Directive). Unfettered use of GMO crops carries a very high probability that international wildlife commitments will be compromised. We believe it is essential that these potential impacts are fully considered before commercial release of GM crops is permitted.

7.5 It is important to note that, in Britain, wildlife is generally very closely associated with, and dependent on, agricultural systems, and is therefore affected much more directly, and more seriously, by agricultural intensification. This is fundamentally different to the situation in North America, where agricultural land uses are generally now low in wildlife, with wildlife being safeguarded in very large national parks, almost as wilderness areas. It is therefore misleading to claim that experience from North America has shown that GM crops do not damage wildlife, since the situations are fundamentally different in terms of scale and practice.

7.6 We believe that GATT and the World Trade Agreement pose significant problems for biodiversity in Britain, and that this needs to be addressed urgently. There is a strong discordance between the requirements of GATT and WTA on one hand, and the requirements of international obligations such as the Convention on Biological Diversity and European Wildlife Directives on the other.

8. QUESTION 6

Are there adequate arrangements for civil liability for environmental damage caused by GMOs?

8.1 We are unable to judge the adequacy of existing arrangements for civil liability, but see this as a very important issue. There needs to be clear and effective arrangements, including financial responsibilities, for dealing with any remedial action needed. However, experience demonstrates that pollution clean-up is both very difficult and expensive, and that the best approach is avoidance. This reinforces the need for good risk assessments, which allow better decisions on whether licences for commercial release should be issued.

ANNEX I

TOPICS FOR FUTURE RESEARCH ON GMOS IN THE AGRICULTURAL ENVIRONMENT

This annex lists topics which we believe need to be researched in order to provide sound data on the potential impact of GM crops on biodiversity. Priority is generally an indication of importance given limited time, rather than importance of the project *per se*. Geographical differences in environment and farming practice should be taken into account, where indicated.

FIELD-SCALE

To compare the effects of GM, conventional, Integrated Crop Management (and if possible organic) crop systems on biodiversity, field scale trials will be necessary. Important considerations include assessment of changes in floral and faunal diversity and abundance, effects of herbicide application, and rotation. The emphasis is on the examination of indirect effects.

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Research project	Geographical location important?	Priority (1-3)
To investigate differences between conventional and GM crops in the relative abundance and diversity of invertebrate and weed populations. To make judgments concerning relative conservation "value".	Yes	1
The potential impacts of broad-spectrum spray drift and leaching on: the flora and invertebrates of the field margin/headland; the development of herbicide resistant flora; the woody flora of field margins and headlands from the target area; the seed banks.	Yes	1
The potential impacts of changes in herbicide regime on the non-crop plants in the field.	Yes	1
To assess the effects on non-target organisms which may be expected from the expression of plant-produced pesticides. Research should concentrate on pollinators, beneficial predators, components of soil food webs and scarce species.	Yes	1
The effects of GM crop management and changes in crop rotation on seed banks.	Yes	1
To suggest improvements to GM crop management practice which may minimise effects on birds stemming from declines in invertebrate and seed populations.	Yes	1
To compile a list of key organisms in the food chain of the arable ecosystem, together with BAP arable organisms. The relative abundance of these organisms in each crop under conventional, organic, ICM and GM husbandry should be compared.	Yes	2

COMPLEMENTARY WORK NOT PART OF THE ABOVE

This tranche of research may require more closely controlled conditions than those of the field-scale trials, at least initially. The project may be concerned with broader observations, country-wide. The emphasis is on the fitness of escaped transgenic organisms.

Research project	Geographical location important?	Priority (1-3)
To investigate the movement of genes from wild relatives into crops (rather than vice versa) and the possibility for transgenic weed populations to arise in this manner.	Yes	1
The characteristics of hybrids between HT crops and weedy relatives, especially increased vigour and competitiveness in relation to unmodified conspecifics.	No	1
To study the dependence of farmland species (birds, invertebrates) on weeds in non-GM crops via field observations in order to provide a baseline of data.	Yes	1
Research on seasonal changes in the species of pollinators in insect-pollinated crops and the degree of coincidence in flowering of the crop and wild populations. This also applies to wind-pollinated crops.	Yes	1
To investigate basic ecology and function of the soil ecosystem, the role of micro-organisms and soil organisms and the potential effects of herbicides and ingestion of GMO transgenes on this ecosystem.	Yes	1
To investigate possible relationships between the whole culture of GM crop management and Integrated Crop Management (ICM). To assess the value in combining elements of the two approaches.	Yes	2

FUTURE/PARALLEL RESEARCH AND DEVELOPMENT

This set of projects concentrates on the development of more benign technology, and would be conducted in laboratory or enclosed conditions, at least initially.

Research project	Priority (1-3)
To investigate the potential of soil organisms and micro-organisms as vectors for transgenes	1
To investigate the possibility for molecular techniques to result in the recombination of viral markers, producing new viruses	1
The potential hazards to the environment of horizontal gene transfer: (a) The capability of viruses to spread transgenes to related species and the consequences of this; (b) Vector-mediated horizontal gene transfer to unrelated species via bacteria and viruses with the potential of creating many other transgenic plant species including weeds	1
The implications of the production of abiotic stress tolerant genotypes (to salt, soil condition, drought, temperature, heavy metals), which may have the potential to grow in habitats unavailable to their unmodified conspecifics. To include the possibility of pleiotropic effects from GM stress tolerance	2
Recent laboratory experiments demonstrated that the insertion of toxins carries risks which may be unacceptable in commercial release. The resistance of herbivory through physiological mechanisms such as thicker skin should be investigated	3
To explore the implications of growing abiotic stress tolerant genotypes on marginal land, particularly that of nature conservation value. To include the identification of likely future trends on GMO biotechnology and implications for the agri-environment. For example, there is a proposed MAFF-funded project to look at the genetic modification of onion, a species with many inter-fertile wild relatives including rare species. There is concern about the potential impact GM trees and fungi (particularly mycorrhizal fungi) could have on native populations and ecosystems	3

April 1999

Examination of Witnesses

BARONESS YOUNG OF OLD SCONE, a Member of the House of Lords, attending by leave of that House, Chairman, and DR KEITH DUFF, Chief Scientist, English Nature, were examined.

Chairman

1. Good morning, Baroness Young; good morning, Dr Duff. We are starting slightly early which is very commendable of us. Thank you for being here in good time and thank you also for your excellent memorandum and for your self restraint in not commenting on things you felt you should not or that were not within your remit to comment on. Very few people miss an opportunity to comment on anything!

(Baroness Young of Old Scone) I am not sure whether in practice we will manage that this morning!

Mr Savidge

2. Can you answer this? How is "Scone" pronounced?

(Baroness Young of Old Scone) It is actually pronounced "Scoon" and I deeply regret taking it as a title since I have been called "old scone" ever since!

Chairman

3. As a mere Sassenach I bow to your knowledge. Is there anything you would like to add to your memorandum by way of any introductory remarks before we start to ask you questions on it?

(Baroness Young of Old Scone) I do not think so. We have described pretty well our position. I would simply reinforce the fact that we do only comment on the impact on biodiversity in the countryside rather than some of the food safety issues.

Chairman: As you know we are looking at some of the ways the Government is organising itself to look at these things in a strategic way so we are very interested in your perspective. First of all, can we start off with the situation in the UK.

Dr Iddon

4. In some of the countries they tend to separate areas where they encourage biodiversity from the farmland and they are not so keen on promoting biodiversity on the farmland. I cite America as a typical example where they intensively farm large tracts of land

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[Dr Iddon Cont]

but at the same time they encourage biodiversity in specified areas. In this country, however, the farmland and the areas of natural beauty are far more integrated than that, put far more intimately together. Firstly, how important do you think it is to encourage biodiversity on farmland in the UK if we are to meet our national European and international commitments?

(*Baroness Young of Old Scone*) Both the UK and Europe are fundamentally different from America, as you point out. Seventy-five per cent. of the surface of the UK is farmed whereas in America it is about a third of the land surface, so you have got the space there to segregate areas for wildlife and areas for intensive agriculture. Here most of the common wildlife that we know and love and that the public like, which is pretty important for the whole of our biodiversity, is totally dependent on the agricultural land, and we simply have not the space to set aside big tracts of land for these common species to flourish in so they have to flourish in the agricultural land. The experience over the last 30 years of intensification under the Common Agricultural Policy is that these common species have very much declined—some by as much as 70 per cent. and, indeed, in some species by as much as 80/90 per cent. Generally most of the farmland birds are having a very bad time and the perception from the research evidence we have is that plants and invertebrates are also suffering in a similar way in the farmed countryside. We really have to make our agricultural land wildlife friendly if we are going to meet our obligations for the conservation of biodiversity, both in UK terms and in terms of our national and international obligations.

5. I was born in the countryside in what was then a small village and I remember seeing cowslips and even violets at the foot of the hedgerows and a huge diversification of insect life. I can remember dragon flies flying by the score around my head at the side of my father's pit where we used water for agricultural purposes. When I go back to that same village now you do not see that any more. Do you think it is mainly pesticides and herbicides that have reduced that intensity of wildlife or do other factors play a role, like grubbing up the hedgerows to make larger fields? Would you like to comment on that?

(*Baroness Young of Old Scone*) It has been a range of factors that have all conspired together. Some of it has been due to the increased use of herbicides and pesticides and the increasing practice of having weed-free—or virtually weed-free—and insect-free fields. We still have quite “weedy” and “insecty” fields in many parts of the UK but in parts of East Anglia, for example, you can see very intensive use of herbicides and pesticides. Another major factor has been the loss of features—ponds and rough bits around farms, hedgerows—and a third factor has been the transfer from primarily spring sown cereals and other crops to winter sown crops. That has a major impact for the lack of overwintering stubbles and bird food, and the ability of weeds to root in the stubbles and proceed to persist into the spring has been a major cause. It is difficult to know which of those has been

the major factor. I think our evidence probably is beginning to show that spring to winter sowing has been quite a major factor, but pesticide and herbicide use is rapidly coming up the list, I am sure that Dr Duff could give more a scientific background to that.

(*Dr Duff*) Yes. There are, indeed, the long-standing research results on the use of pesticides, for example the organochlorines, which are known and demonstrably have huge effects on the populations of raptors and other birds of that sort, but there is also very clear published scientific research from the Game Conservancy which has demonstrated that pesticide applications have had huge effects in reducing the population of grey partridge. So there is very clear evidence of the direct and indirect effects of pesticides in reducing much of our farmland wildlife, in addition to the factors which Baroness Young touched on as well.

(*Baroness Young of Old Scone*) Could I add one other factor. One of the other features of the switch from spring to winter sowing, of course, is the increased use of fungicides in order to protect crops planted in the winter, and we are beginning to think that fungicides are actually quite an important factor as well.

6. Could we explore briefly the kind of biodiversity that has been affected. Is it mainly bird life, insect life, across the spectrum? Would you like to comment on that and also perhaps give us some indication as to whether there are areas of the United Kingdom which have been less affected and areas more affected? Do you detect a geographical bias?

(*Baroness Young of Old Scone*) If we take the lowland farmland, which is primarily where we would be concerned initially in terms of GM crops, there is very good evidence about the decline of farmland birds and I think that it is indubitable that many species have declined by as much as 50 per cent., some more than that. In terms of plants, there is good evidence with some species of what we would call arable weeds, the sorts of things that farmers want to get rid of and the sorts of things that are plants that you remember from your youth in the countryside, of a significant decline of a similar magnitude of some of these arable weeds. In the case of some plant species, and more particularly in the case of invertebrate species, where we do not have such good research information, the intimate association of these species with each other, with plants and insects being an important part of bird food during part of their breeding cycle, probably means that there are declines right across the spectrum of biodiversity—plants, insects and birds—caused by intensive arable production. It is more marked in the east than it is in the west because we have more intensive agriculture in the east as far as arable agriculture goes.

(*Dr Duff*) The other issue is that in the uplands the land use is obviously different and I think the pressures there, which we recognise as having led to major reductions in biodiversity, are changes through increases in the numbers of sheep grazing, and the turning of old hay meadows into more productive

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[Dr Iddon Cont]

pastures to feed many of those animals in the winter. So there are very different effects in the uplands and lowlands but taking a general point, both in the uplands and lowlands there have been very significant reductions in biodiversity right across the board in the last 50 years.

7. Could you comment on the new indicators that the Government has published quite recently, and perhaps comment on the headline indicator in particular?

(*Baroness Young of Old Scone*) We were delighted that the headline indicators did have a farm and bird component because it is probably one of the most easily tracked indicators of agricultural intensification and it is also one of the most currently intractable. If you look at the range of headline indicators of quality of life or sustainable development or whatever we are going to call them, with most of them you can see the sorts of policies that are beginning to come through will begin to address them. Agricultural policy currently has remarkably few things in place that will make any impact on that farmland bird indicator, so it is an incredibly important one in terms of mapping the outcome of agricultural policy reform.

8. Finally, leading into the main topic of discussion this morning, you have demonstrated that it is not just pesticides and herbicides but also fungicides, and more importantly, the changing techniques in farming that are affecting biodiversity. Are we in a position, do you think, to take a baseline measurement at this period of time, before the possible introduction of the growing of commercial genetically modified crops, in order to ascertain at some time in the future whether that introduction, if it happens, has affected significantly biodiversity beyond the present position?

(*Baroness Young of Old Scone*) I think on the bird front we have enough data to be able to do that, and voluntary assistance in place. I think we are rather less well-placed on the plant and insect front. One of the things that is being proposed as part of the research process is to take, in the case of field-scale trials, baseline monitoring data so that we can tell what the biodiversity status is before planting and then assess it during and after the planting, but that would only be on a field-by-field basis. I think one of the flaws of baseline monitoring now and then assessing in future with field-scale commercial release is that the stable door will then be well and truly unbolted and the horse will be out. We have spent the last 30 years monitoring post hoc the decline of farmland biodiversity as a result of agricultural policy and it feels slightly bizarre to continue post hoc to monitor these declines, particularly when the new technology will not be reversible.

Joan Walley

9. If I could follow that through further, it seems to me that what you are telling the Committee is that encouraging biodiversity on farmland right the way across the United Kingdom is really important?

(*Baroness Young of Old Scone*) We should make our position clear that we are not anti-agriculture or anti-farming. We do believe that we need (a) to grow crops to eat, and (b) to have a competitive farming industry, and I do not think we are in the position of some groups who would say that we all have to go back to more traditional agricultural methods. We recognise that intensive farming will need to continue and that genetically modified intensive farming could well be designed, or it is possible it could be designed, in ways which would actually be good for biodiversity. Our bottom line is that intensive farming must take measures alongside it to enable wildlife to flourish as part of that intensive regime, which is not happening at the moment.

10. So we have that position and we have the position, as far as the Government is concerned in respect of the new indicators, which, if you like, gives greater emphasis to the importance of biodiversity, but may I ask you, in the light of the letter you sent to the Prime Minister on 4 February, which set out some of the importance of research, if you could perhaps comment on the point you made in that letter, that, given that there was going to be more research by the Department of the Environment, Transport and the Regions and MAFF, which was going to report in the year 2002, how that squares in the light of the scientific information you already have, which shows how biodiversity is being reduced?

(*Baroness Young of Old Scone*) What we have at the moment is good evidence for some species, and circumstantial evidence for other species, of biodiversity declines and a fairly good idea of how conventional intensive agriculture has impacted on that. What we do not have at the moment is sufficient research evidence of the impact of GM crops on biodiversity and that is the research that needs to happen before we would be content to see commercial releases. That is the research that is being undertaken at the moment, which needs time to be run through and be assessed.

11. Given that, that means then that you are still concerned about the decision of the Advisory Committee on Releases to the Environment to go ahead with the approval for herbicide-tolerant rape, the point you have just made about the cart before the horse, that you are still concerned about that?

(*Baroness Young of Old Scone*) Yes, we feel releases ought to be for field-scale trials under very strictly controlled and monitored conditions to allow the research to establish what the impact of field-scale growing is on biodiversity. We believe that you have to do that in order to find out what the impact is. Keith, do you want to comment on the research issues?

(*Dr Duff*) Yes. The research process, we believe, is absolutely vital. As Baroness Young said, we do believe there is very compelling circumstantial evidence that we talked about earlier. What we need to be sure about, though, is that we can demonstrate clear cause and effect to a greater degree of accuracy and specificity than we can at the moment about the effects of growing GM crops, because it is the management of the crop rather than the fact that it is genetically modified that is one of the key things that

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concerns us. There are obviously issues about the risks of gene flow from the genetically modified crop into related wild species, but it is the management of the crop, the use of pesticides through the growing season and the effect that will have on headlands and hedges, for example, that is the real concern. This is why we believe that properly designed, properly managed research projects and field trials which are based on the "split fields" approach, and look at the effect of different treatments on two halves of a field that has been treated previously in the same way, is absolutely vital. We have to be sure that the evidence which is there is as clear as possible, because in science you are always going to find debate about interpretation of the evidence.

12. And you think that evidence should be there before decisions are made?

(Dr Duff) We believe that evidence should be clear before commercial release is made, otherwise we do not see on what basis you can undertake a risk assessment.

13. Finally, I heard on the news this morning, and I have not had the details of it, something to the effect that Michael Meacher has actually accepted that there is cross-pollination of GM crops. Are you in a position to comment on that at all? I think it was in relation to bees.

(Dr Duff) No, I have not seen that.

(Baroness Young of Old Scone) There was a study which was briefly reported a few months ago on the extent of spread of pollen borne by bees, which was, in fact, up to 2 km, which, of course, does raise questions about the whole issue of separation and particularly about the impact on the ability to label and on organics, as well as needing to take a broader view about gene spread as a result of pollen transfer.

14. In that case, it would be very interesting to have any information you may have on that in view of what you just said about research trials.

(Baroness Young of Old Scone) We can submit something to you. Could I add one other thing about the research trials. We are slightly concerned about current discussions on the design. We believe that the research trials need to be undertaken in the way that Dr Duff has just described, where you take one field and split it and manage the two halves separately and compare the results. Paired fields—one field in one place and one field somewhere else—will have different conditions and we believe that that is not scientifically valid as a comparison.

15. And have you expressed those views to the Government?

(Baroness Young of Old Scone) We have.

16. To which part of the Government?

(Baroness Young of Old Scone) I would have to come back to you on that one. I suspect DETR.

(Dr Duff) Yes, we have expressed those very strongly to DETR through part of the process of designing the actual research. We are involved in the steering group which is looking at the design of that research.

17. And are your views being taken into account?

(Dr Duff) As far as we know, yes. The decision has not been made, the contract has not been let, as yet.

Mr Truswell

18. While we are on the question of research and the points you have made, may I follow it through hypothetically to a degree. Research is one thing; how you respond and how you act upon that research is another. Do you envisage any circumstances in the future where that research might lead bodies such as yourselves to suggest that certain types of crop would be banned or that there would be a need for major restrictions on where they might be grown, the volume that might be grown and maybe for very intensive monitoring as to how much pesticide/herbicide is used in certain circumstances? Would that be the sort of response that might hypothetically be based on the sort of research you have just discussed?

(Baroness Young of Old Scone) I think there is a range of responses following on the research process and its analysis. In some cases, before one even got to field-scale trials one might want to rule out growing certain crops. We are particularly concerned, for example, about modification of native species, particularly forage grasses and trees, where you could see serious competition with wild natural versions of these crops. In those circumstances, I think the risks would be apparent and sufficiently high at a very early stage. In the case of field-scale trials there could also be a range of responses. You might come to the view that there needed to be particular conditions in use, and we are concerned that if that were the case, conditions about how you plant them, about the buffering requirements, about pesticide and herbicide use, and about provisions for refuges for insects if it were insect resistant crops, would need to be not simply part of a voluntary code of practice for growers but actually a statutory code of requirements for conditions in use, as is the case currently with the use of pesticides. We think that these conditions are of such importance that they need really to have some statutory basis, to be inspectable, and to have some statutory remedies if they are not adhered to. There may well be cases where you would have some quite difficult decisions to call, where the use of the crop might be so potentially damaging if the conditions were not met that you might find, quite frankly, it was too risky, but that would all have to be part of a proper risk assessment process. What we would like to see is the risk assessment process not just to assess the risks but also to assess the benefits, because we feel that GMO crops are constantly being criticised whereas they might, if properly designed and properly used, have some potential to improve the status of biodiversity. So we would really like to see the balance adjusted so that those positive measures look at what the conditions in use and the design of these crops might be, to produce biodiversity benefits as well as assessing the risks at the time of the risk assessment.

19. You mentioned the species that might be ruled out at the outset. How far has that view been absorbed into government thinking, from your perspective?

(Dr Duff) I think the point has been very well taken by the Department of the Environment,

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Transport and the Regions. From all the discussions we have had with them they fully understand our concerns, particularly on the forage crops issue, because there is already very strong evidence that shows that grasses cross-breed very readily. Once you have, even under perhaps restricted conditions, the growing of genetically modified forage grasses, it would be, we suspect, quite impossible to prevent cross-breeding of those into native grasses. So the effect very quickly is that you would almost undoubtedly lose the few remaining wild flower meadows and hay meadows that remain, with the wild flowers and the range of insects and birds that depend on those. So that is a matter of significant concern to us, but it is one that has been taken well on board, I understand, by officials in the Department.

(*Baroness Young of Old Scone*) There is one other species we are concerned about, and I think our concerns are beginning to be taken on board, and that is the question of genetically modified salmon farming. This produces vigorous, fast-growing salmon that mature much more swiftly than the native stock, and which could out-compete very rapidly the native stock, and if you have a salmon farm we think the potential for release is total in this respect.

Mr Baker

20. Could I follow that very briefly. It is very interesting what you are saying, Baroness Young. The regulatory regime for trials and for, in due course, commercial releases, if they are allowed, are different and yet we are now moving towards farm-scale trials, where there may be concern in some quarters at least that that is equivalent in environmental terms at least to a commercial release. Do you share that concern? Do you believe the regulatory regime is adequate for the trials in particular relation to the isolation distances which have been set and the extent to which the Health and Safety Executive is able to police this?

(*Baroness Young of Old Scone*) Could I talk in general and perhaps Dr Duff would like to talk about the specifics of the isolation issue. I must confess that I am slightly concerned about the kind of grey area there is around field-scale trials in terms of what the legal status of these trials is, and I can sympathise with the Government in its difficult position in this one in that we are tremendously open to legal challenge. Nevertheless, the limitation to field-scale releases is being undertaken voluntarily by the industry, mostly on the basis that it cannot produce enough seeds to go much further than field-scale releases, and we welcome this. But voluntary agreements do not always stick, and I would not like to judge whether we would be in a position of such agreement if, in fact, there was available sufficient seed to plant on a much wider-scale basis. I do hope that the voluntary agreement for field-scale trials will stick and that we will get adequate time to do a proper assessment of the research, but we will only see that year-on-year because the Government is going to have to make the decision year-on-year about whether it now has enough information to keep at field-scale level rather than full commercial release.

21. Would you have environmental concerns about the regime applying at the moment if farm-scale trials were to go ahead?

(*Dr Duff*) I think what we would not want to see is farm-scale trials in effect becoming a kind of back-door commercial release. We believe they need to be managed properly. They need to be managed as real farming activities because if they are not, then the evidence that one gets from the analysis is perhaps open to question. So we have to have effective real farming operations delivering them. We need to make sure they are policed effectively, too, and that does mean the points you made about the right separation distances or appropriate separation distances being applied, being enforced and being policed are essential, and we have to make sure, and we would certainly advise the Government and the Department very strongly of the need for this.

22. But the isolation distances we are talking about are wholly inappropriate, are they not, given how far bees can travel, for example?

(*Dr Duff*) I have not seen the details of the distances that are being applied but our view would be that they certainly need to be sufficient enough that the trials are, in effect, isolated, because if they are not, the risk is that you end up with the kind of wide-scale countryside releases that give us concern in the first place.

(*Baroness Young of Old Scone*) Could I comment that I think the pollen spread issue, and what that means for isolation, is not yet clear because what we have not got enough information on how fertile and vigorous those hybrids that are created by pollen spread, for example, are. If they are fertile and vigorous, that will be a problem. If they are not very fertile and not very vigorous, it may, in fact, be a self-limiting problem, and I think more research needs to be done on that. May we come back to you on the issue of separation?

23. Yes. May I ask you now about your position on a moratorium. This is something which, as you will know, has been the subject of some dispute in the media. It would be helpful perhaps on the record to clarify whether it is three years or five years, what the reasons for it are and, therefore, by definition what criteria would be met for you to wish to lift that call?

(*Baroness Young of Old Scone*) We no longer talk about a moratorium because it has been hijacked by practically everybody in this debate and means something completely different, so it is no longer a valid term. What we are saying is that we want a period of research sufficient to have proper field-scale trials, and have enough time to analyse that data and come to conclusions as a result, and that fuller-scale commercial releases should not happen until that has happened.

24. So can you put a timescale on that?

(*Baroness Young of Old Scone*) The research that is currently under way will be complete by 2003. Depending on what it finds, it may or may not be a simple process of coming to a decision as to what its impact is, and I think the important thing is that this is going to be done on a stepwise basis because you

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cannot actually make decisions about what happens next until you have seen the result of what happened at the previous stage.

25. So it will be another three to four years effectively from now?

(*Baroness Young of Old Scone*) Three to four years. We have said throughout that where research on growing crops is concerned, it really needs a period that will take account of several generations of the crop and rotations to see what the impact on the farm-scale rotation is.

26. Lastly on this, could I ask you about pesticides or biocides. The industry claims that one of the benefits of GM crops would be a reduction in pesticide use, whereas some of the pressure groups argue that because plants are being developed which are herbicide resistant, that encourages and, in fact, renders endemic the use of pesticides on those crops and, therefore, will lead to more dependence on pesticides. Does English Nature have a view on what the likely impact of pesticide use will be from the development of GM crops?

(*Baroness Young of Old Scone*) One of the issues we want to see tested at field-scale trial is what different sorts of applications, herbicide and pesticide regimes will do for biodiversity. One of our concerns is that GM crops, both herbicide-tolerant and insect-resistant, give greater capacity for having virtually weed-free and insect-free fields and that will without doubt have a big impact on biodiversity. What we do not know is what different sorts of regime might produce. The claims that are being made for less pesticide and herbicide application are often about volume rather than about impact and the important thing is to find out what the impact on biodiversity is, because it might well be that repeated applications of carefully targeted herbicides and pesticides is less damaging to biodiversity than one or two applications of broad-spectrum herbicide within the growing crop during the growing season, and it is that sort of impact that we need to test out in field-scale trials.

27. But even in terms of volume, never mind the impact, do you share my perhaps cynical concern that if you have a company which is buying up pesticide companies who are developing GM crops, it would be rather odd if it brought forward crops which led to a reduction in pesticide use?

(*Baroness Young of Old Scone*) I must confess I am slightly ambivalent about this. We have a similar situation at the moment in conventional agriculture, where most of the advice that farmers get about best herbicide and pesticide application come from agronomists who are employed by herbicide and pesticide companies, and yet we have seen a reduction in gross volume of applications and a much more targeted process. It seems to me that we cannot leave this to risk any further. We have now to have those sorts of best practice conditions embodied in statutory codes of practice that can be enforced, as they are, indeed, with some of the pesticide applications at the moment.

(*Dr Duff*) Could I add that even if the supposition that the development of GM crops with herbicidal

resistance resulted in the use of less herbicide were true, our view, as Baroness Young said, is not that the volume used is the issue. It is the impact of the use of it on wildlife, where it is applied, when it is applied and what it does to the animals and plants living in the field that, is critical.

Mr Savidge

28. Part of the distinctive remit of this Select Committee is looking at organisational and administrative matters. Do you feel the Government has adequate mechanisms in the form of its advisory committees properly to assess the environmental risks, particularly the risks for biodiversity that could follow, directly or indirectly, from the development of GMOs?

(*Baroness Young of Old Scone*) Until very recently I do not think there were adequate mechanisms in place and there is still discussion going on as to what the shape of appropriate mechanisms should be. The Advisory Committee on Releases to the Environment looks on a case-by-case basis and was not charged with looking at broader environmental impacts, nor, indeed, at cumulative effects. That position has now been changed and there is a sub-group of that committee now looking at what should be the criteria and issues in terms of conservation of biodiversity, that the committee should be charged with taking on board in the future. We understand that the membership will be expanded to bring on board those who have a better knowledge of biodiversity impacts and ecological impacts, as well as agricultural impacts. There are still some other institutional issues that need to be addressed. Clearly there needs to be a much more strategic approach to the use of GM crops for the future if we are going to get work commissioned and under way that actually points the design of GM crops at environmental improvement as well as agricultural improvement. That will not happen, I think, without some body being set up to look in a much more strategic fashion at not only the potential impacts and implications for the environment of current planned releases but also at trying to get a much better direction for GM crop development for the future. We certainly would be very much in favour of the idea of an over-arching committee that would span government departments and some of the existing advisory committees, that would take a much more strategic view and take on board some of the other issues that are of great concern to the public, including food health and some of the ethical issues as well. I am personally also a great believer, although I do not put much faith in it, that it is still a good idea to have plethoras of committees dotted all over the landscape, but I do also think that there is a need for some sort of stakeholder forum where some of the huge public concerns can be properly voiced and analysed and taken on board, because otherwise we are sitting on top of a very big steaming kettle that is about to blow.

(*Dr Duff*) Could I add another point to that. We are concerned about the remit of the Advisory Committee on Pesticides, which clearly is the important equivalent committee to ACRE. At the moment the Advisory Committee on Pesticides does

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not take account of the biodiversity effects and we consider that to be a serious gap. In fact, I think we would see a need for a much closer linkage between ACRE and the Advisory Committee on Pesticides and, indeed, clarity of the role of other departments, too—DTI, for example—to make sure that all of the aspects can be considered at a strategic level in the kind of way that Baroness Young highlighted.

29. And that would be a closer linkage not just through the over-arching body but through their actually working together more?

(Dr Duff) I think they would need to work together, preferably with common information.

Mr Savidge: I will return to the question of the over-arching body later in the questioning.

Mr Truswell

30. In response to the last question you touched upon the need for a strategy to address the environmental impacts of GMOs, but I wondered if you could be a little more specific for us in terms of the goals, the means and the milestones that you see as the essential components of such a strategy?

(Baroness Young of Old Scone) As far as the impact on the environment and biodiversity is concerned, I think what we would be looking for is a strategic look at not only what is the direct impact of GMOs but also their indirect impacts and cumulative effects. We would also want to see an analysis of what the land use effects might be of a transfer to genetically modified crops growing on a wider-scale basis. I make jokes about growing pineapples on the top of the Cairngorms but one could see crops being developed which would be resistant to cold, resistant to wet, able to grow successfully on very poor soil, able successfully to grow in very wet areas and, therefore, there could be more winter planting than before, and this could have a major impact on some of the marginal low-productive rough areas that are currently the areas where wildlife clings on by the skin of its teeth. So we would want to see that looked at and we would also want to look at the whole question of sustainable agriculture. It seems to me that the lessons of 30 years of intensification of agriculture should not be forgotten, that we need to learn from what we have seen over the last 30 years, and look at how genetically modified crops can form part of the mix in the sustainable approach to agriculture for the future. The last point we would want to look at is the point I raised earlier, which is that somebody somewhere needs to be looking at how we get the potential benefits assessed and developed, if indeed there are potential benefits of GM crops, because at the moment we get lots of assertion about the benefits but nobody is doing terribly much to bring those to the marketplace.

31. That was going to be one of my follow-up questions. Have you looked at any of these claims because it seems to me and certainly to other Members of the Committee that it is based on very broad assertions and not really backed up by any clear evidence? Have you looked at any of these assertions to test them out?

(Baroness Young of Old Scone) There has been some work done in America on some of the alleged benefits of GM crop growing but, of course, none of those results can be read over to the United Kingdom system. Quite a lot of the benefits of the American system, apart from gross volume reduction of pesticides, are based on the fact that with GM crops there has been a significant transfer to no-till agriculture systems in the United States. For some reason no-till agriculture is not looking terribly popular here. I do not quite understand why. I have been asking some of the research institutions why farmers do not appear to get fired up by no-till agriculture but that is just another example of why the circumstances in the States cannot be read across to here. Keith, I do not know whether you want to comment on whether we have any evidence through the year. I suspect most of the research studies have not yet been done that would demonstrate the potential benefit.

(Dr Duff) That is right. As you say, there is a lot of assertion and very little evidence. In fact, we would be hard put to put our fingers firmly on the evidence, which is why we have identified the sorts of questions in the annex that we think research needs to address. But I agree with Baroness Young. I think we do need to look at agriculture in the round because there are huge technological developments taking place. There is also the question of climate change, which also has the potential to change the way we use land in this country and I think we need to look at that as part of the whole equation, too.

32. I think it is a very important point and one again that I am particularly concerned about, that the debate has been about “Frankenstein” foods and the effect on human health and perhaps a subsidiary debate about what might be called “Doomsday” crops, but no-one has really broadened it out in the way that you have suggested. I just wondered what would be the appropriate forum to put GM crops in a wider context over sustainable agriculture policy strategy?

(Baroness Young of Old Scone) I firmly believe that if an over-arching committee were charged with the task of strategy on GM crops then there could be a sub-group that would draw on the experience of the research institutions, the industry, the agencies like ourselves and DETR and MAFF to bring together and look at sustainable agriculture. I know that MAFF has been working sporadically on this but we are still a very long way away from having a vision of what sustainable agriculture for this country would be.

(Dr Duff) There is an interesting parallel in the climate change area, in that climate change is another one of these areas where you can find a wide variety of views held amongst scientists. What has happened there is that there has been a group called the International Panel on Climate Control set up, which has attempted to bring together scientists from all over the world to discuss and explore the issues together and try and reach some kind of consensus. It would be perhaps worth considering that kind of parallel approach to try and achieve a greater togetherness, as far as one could, about what the scientific information behind the development of GM crops in an agricultural

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[Mr Truswell Cont]

context was. That may be worth considering. It is an idea that we have begun to think about.

Mr Baker

33. Could I ask very briefly, one of the limitations, I suppose, on irresponsible and bad behaviour is always the threat of legal action. Can you indicate to us—it is a question I am having difficulty getting an answer to—who you believe would be liable for any environmental damage caused in the field? Would it be the farmers, would it be the people who produced the seed, would it be the Government for allowing the regulations or would it be nobody?

(*Baroness Young of Old Scone*) I do not think we have a view. I do not think anyone has really satisfactorily assessed what the liability issues would be, particularly since it is quite difficult to assess what the impact or it's extent would be. We do not know yet what the real impacts are, so it would be difficult to assess just exactly what the scale of the damage would be and who would be the aggrieved parties, as it were. So I am afraid we have not really looked at that.

34. But you agree there needs to be a clear line here?

(*Baroness Young of Old Scone*) Absolutely, yes.

35. Your evidence states that "there is significant potential environmental advantage in encouraging industry to focus effort in [the direction of alleviating damage to wildlife]"—that is in your submission to us—but that "there has been little, if any, direction given by Government " That was also in your submission. What means are open to the Government to influence the biotechnology industry to concentrate on applications of the technology that mitigate the environmental impact of intensive agriculture?

(*Baroness Young of Old Scone*) That is why we would be very much in favour of having a strategic forward look, a framework within which one hopes that Government could encourage the biotechnology industry to operate. I think the Government, alas, is rather hampered by the number of tools that it actually has in this area, quite frankly. The European process for agreeing releases on a commercial scale, or at least for agreeing the marketing, is qualified majority voting. So to some extent we are hampered in being only one voice in Europe. In terms of world trade processes we are also under considerable pressure in this country. So I can understand why the Government is attempting to work on a voluntary basis with the industry because it has very few other ways of ensuring that the right direction is taken for the future. That is why I think getting the trials up and running, and making sure that they are rigorous and that we do take greater action at the end of them, if that is required, is very important. We have to be able to demonstrate that, if the trials relieve concern or if there are conditions in use that can be used to relieve concern, they go into place and are used effectively. But we also have to be able to demonstrate that if the trials demonstrate some risks are just too high, we do take effective action and defend our decision.

36. That is a very important point and I want to concentrate on that. You seem to be saying—and I

do not want to put words into your mouth—that the Government has a large number of tools available but none of them actually does the job very well?

(*Baroness Young of Old Scone*) I think none of the tools is very effective.

37. You mentioned the European Union and, of course, we have the revision coming up with the 1990 Directive on deliberate releases to the environment. I assume you have seen the Government's stated position on that. Are you happy with the line the Government is taking on that? Do you think it is sensible?

(*Baroness Young of Old Scone*) I think the only point we would want to make additionally is to strengthen the provision for looking at cumulative effects of releases in the revision.

(*Dr Duff*) Yes. Linked to that is the implication of the continued use of the fast-track approach, which we feel very much does not address the cumulative effects. That is a significant issue which we think does need to be high on the agenda.

38. You mentioned the majority voting system in the United Kingdom in your answer just now. Is the sub-text of your concern that it is possible, if there was someone in the industry who was unscrupulous—heaven forbid—to find the weakest link in the European chain of approval in that particular country and then effectively bypass what our Government wants to do? Is that your concern?

(*Baroness Young of Old Scone*) I think I would avoid the conspiracy theory but the reality is that if a crop is regarded as acceptable in one country and its environmental aspects have been assessed in one country, that does not necessarily mean to say that it should be released in another country because the ecological conditions are so different, but it does really need proper assessment within each different ecological setting. Even within the United Kingdom you could find very different conditions.

39. I agree with that in principle, but just to be clear—I am not clear on this—do you believe the British Government with the restrictions imposed on it by the European Directive and with the welfare organisations' rules, which seem to me to overcome the environmental impact of particular activities—do you believe the British Government, if it identifies a biological threat or threat to biodiversity, if you like, within the countryside, is able to resist either the trial or the commercial planting of a crop which nevertheless has secured approval within Europe or otherwise has been approved in some looser sense by the WTO?

(*Baroness Young of Old Scone*) It is certainly able to resist at trial stage provided no commercial release agreement has been given. Of course, the grey areas are those trials where we are talking about field-scale trials where *de facto* commercial release is available. I think you obviously need to ask Government directly but there is some doubt about the Government's ability to withstand international pressures and, indeed, European pressure, and I think that is an issue which will eventually have to be tested, both against Government resolve and against the law.

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[Mr Baker Cont]

40. Jeff Rooker, when I questioned him about a year ago on this matter in this Committee, said, "We are not in the driving seat," which slightly alarmed me. May I mention codes of good practice, which you referred to in your submission to us, for the development of GMOs and the ACRE sub-group established to develop one. What do you envisage in such a code? Will it be about "process" requiring the conduct of environmental appraisal and the provision of information, or will it be about "substance" and the kind of applications that are most likely to contribute to sustainability?

(Dr Duff) Our concern in the sub-group is largely focused on making sure that the impacts of the applications which are coming forward through the system are properly assessed. So it is very much to do with making sure that the assessment protocols, the information that is collected, the timescales over which it is done, the experimental method and design and so on, are adequate and properly applied, both in the ACRE forum, and, as I mentioned earlier, through the consideration of the pesticides or biocides that go with them. The question of the wider application then of GM crops as part of sustainable agriculture I think comes back to the broader point that Baroness Young was making earlier on about the need for a proper forum for a strategic look at agricultural development issues. I think we would see that as being part of that forum rather than the ACRE sub-group at the moment.

(Baroness Young of Old Scone) The one thing we really have to make sure is addressed is that when we get to the point where we were talking about commercial-scale releases there is in place a code of practice that addresses the whole spectrum of potential impacts on biodiversity, ranging from herbicide and pesticide use, buffering, the impact on areas that are currently wildlife-friendly, and the possibility of the introduction of refugia zones. What we have not had in conventional agriculture, which is mechanisms to promote more wildlife-friendly areas around intensive crops, so that we begin to see a change from the damaging old-style 30 years to learning from that and moving into a new, more sustainable agricultural production, which does not mean the end of intensive production but getting the right sort of wildlife-friendly areas alongside.

41. So you would resist pineapples on the Cairngorms?

(Baroness Young of Old Scone) I am afraid so.

Chairman

42. Going back to a point which you made to Mr Baker just now about the means open to the Government to influence the biotechnology industry to bring forward applications of technology which help the environment rather than damage it, you were suggesting that the present means were not very good and then went on to say that the over-arching body which you are recommending should look at this, but would not the Government—being devil's advocate for the moment—say that it has already got a very big scientific budget which is planned for the various research institutes, that the whole forward programme

which co-ordinates industry, academia and Government should be looking at the right way forward for biotechnology in this country? There is quite a big effort going into that under successive governments. Would not that be their defence, that they are doing quite a lot about it really?

(Baroness Young of Old Scone) I think the over-arching committee needs to be more than just a science committee. It also needs to take account of some of the public concerns as well, and also needs to take much more account, of the broader ecological and environmental issues, much as the existing programme looks at the individual applications design. The proof of the previous work that has gone on to manage the direction of biotechnology in this area is that it simply has not happened. There is not a lot of research going on about how you produce GM crops that are good for biodiversity. So it has not worked so far, and something different has to happen.

Mr Savidge

43. Continuing on the question of the over-arching body, could you amplify a little, precisely what gaps you see in the current system which you think the over-arching body could fill?

(Baroness Young of Old Scone) Part of the problem with the current system is that everybody is in their own little area. We have ACRE, we have the Advisory Committee on Pesticides, we have the industry, we have people like us giving advice on the outskirts of all that, and the over-arching committee, I think, would bring all of those together, including some of the ethical concerns that have been voiced and some of the issues of public concern that are associated with food safety. It would also operate in a very different way. Much of the work done by the current committees is on individual applications and so they are less able to look at combinations of applications or, indeed, medium- to long-term development of strategy. So those would be the two things we would want to see that are different from the current regime in that over-arching committee.

44. Taking a topical issue in relation to that, do you think that the over-arching committee should include people who might be regarded as connected with vested interests, and when we are talking about vested interests, of course, we might be talking either about private companies or about environmental pressure groups? Do you feel that those should be included? If so, should they be limited in the number of people represented on the body or should they be excluded completely?

(Baroness Young of Old Scone) I suspect we are all, to some extent, guilty of being vested interests. We like to think that we are rational, science-based, analytical and reasoned. Nevertheless, our job is to look after biodiversity. It is quite difficult to get scientists in this field who have not had some connection with the industry because much of the scientific work is funded by the industry. So I think that is an issue that we need to look at and perhaps identify larger shares of research budgets for Government-sponsored science in this field. If you

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look at the agriculture budget, the Department of Agriculture's budget, very little of that budget actually does go towards biodiversity in any form. We have certainly made pleas over the years for that to be relooked at and that might produce a few more scientists in this field who are not necessarily very closely connected with the industry. But my belief is that the over-arching committee would need to have a wide spectrum of people on it, many of whom would have vested interests, consumers' vested interests and biodiversity vested interests, in developing technology that can be used successfully, and one of the things we have been trying to get over to the biotechnology industry is that successful use of this technology depends on their being able to demonstrate the benefits. No-one will ever be able to reassure the public, and we certainly will not even attempt to reassure the public, on environmental grounds until the industry can demonstrate that it is going to produce technologies which are of benefit to biodiversity. So I would hope that the broad spread of the membership of the committee might leaven the lump a bit. At the moment, while everyone is in particularly application-focused technical committees, there can be rather a preponderance of people connected with the industry, for example on ACRE in the past.

(*Dr Duff*) I agree with that, but equally I think if the committee, be it an over-arching committee or a technical committee, is to have any credibility, it does need to have on it people with expertise in the fields concerned, and I think you are quite right in suggesting that a large number of those are working in the industry, and I think we should not be afraid of that. We need to make sure that the Committee is broad enough to take a wide spectrum of views, and that there is wide debate and open discussion. That, I think, is the way to address it.

45. Picking up a particular point within what you said there, how far do you feel there can be some dangers in the fact that increasingly research institutes and academic institutes over the last decade or so were moved from the idea of public funding being expected to increasingly get private contracts, whether from private companies or again from environmental pressure groups? Is there a danger that that can make either the individuals or sometimes even the institutions open possibly even to false accusations? You used the phrase "conspiracy theory" before. This is an area where they believe they breed without need of genetic modification, I think, and journalists often feed off them, but is there a danger of that possibly in what has been happening?

(*Baroness Young of Old Scone*) I think it is really quite difficult for research institutes these days because they do have to earn their money from somewhere if they are going to get the research done, and if they have done good and effective scientific research, scientists bat quite hard for what they believe as a result of their research, and so they are going to be supportive of their own findings. The research at the moment is pretty partial, it is not comprehensive, so that most of the research is about the agricultural benefits of these crops and new strains of technologies, and not about how they can be made

biodiversity-friendly or how they can reverse the declines in farmland biodiversity. So we do not have many scientists battling on that front because they have not been funded to do the work, and we need to find ways of making sure that we do have some scientists out there. Indeed, I would like to see the biotechnology industry itself funding that sort of research so that we have scientists out there who are actually battling for the fact that they have found ways of making this biodiversity-friendly.

46. If I may move on to another issue, what sort of powers do you feel the over-arching committee should have? Should it actually have the power to overall postpone the decisions taken by groups like ACRE or ACP, having co-competence under European legislation, or would you see it simply as being a co-ordinating and sort of foresight and oversight role?

(*Baroness Young of Old Scone*) I think its primary role should be to get a strategic forward look going and the framework within which the committees can operate, but there will, I think, be individual applications where, quite frankly, they are so controversial and the risk assessment process is so fraught that there might well be a need for an application to be assessed against the broader strategic direction by that committee, but I would certainly not want to see layers of bureaucracy except in those very difficult cases.

47. What sort of role do you think the over-arching body should have in actually encouraging biotechnology industries to go in the direction of government GMO strategy?

(*Baroness Young of Old Scone*) I suspect that there are very few sanctions that the Government has available on the biotechnology industry other than rigorous consideration of the applications and regulation process. I would like to think that the biotechnology industry would recognise that if the Government and a reputable strategic body like the over-arching committee were putting forward some very strong guidance and very strong directions for the future, the biotechnology industry would have the degree of social responsibility to take on board the fact that if they are going to be acceptable in this country publicly, they need to demonstrate that they have a perception of what social responsibility in this field would look like. We are seeing tomorrow's company-type initiatives all over this country, and I think that being environmentally sound is something that the biotechnology industry needs to see as a fundamental component of being a modern company.

48. I follow exactly what you mean. There are other areas where one sees companies recognising that it can be in their own self-interest to show some sort of social responsibility?

(*Baroness Young of Old Scone*) At the moment we have such a hoo-ha about GM crops in this country and GM foods. We have constantly said to the biotechnology industry that the environmental impacts are comparatively easily dealt with compared with the concerns about food safety in the public mind. We could conceive of development of the right sorts of technology that would be of environmental benefit and

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the right sorts of conditions and controls that would mean that we could say, "Yes, we are fairly satisfied." I do not think that will happen tomorrow or even next year but we can see that over a period of years that might get bodies like us off the back of the biotechnology industry and able to reassure the public about the environmental safety of these products, but at the moment, as long as the concerns about food safety can be combined with our very legitimate fears about environmental safety, the two combined quite rightly do cause public concern.

Mr Baker

49. A very short question on the over-arching body. You mentioned food safety in your answer. Would you see an over-arching body dealing with environmental concerns and food concerns, or do you not think that environment and food should be separate? Would you see the Advisory Committee on Novel Foods and Processes being part of this arrangement?

(*Baroness Young of Old Scone*) I think we would want to see the over-arching body also take the Advisory Committee on Novel Foods and Processes under its wing. We would be looking for a strategy that addressed all the GM food and crops issues, though they are in some cases very separate.

Joan Walley

50. To follow this theme through, you are talking about this over-arching body and we are talking about the need for joined-up thinking right the way across all government departments, and I just wondered, first of all, how you see the role of the Cabinet Committee on Biotechnology and how effective you feel that is? I ask that particularly in view of what I think is quite powerful language in the letter you sent to the Prime Minister, where you actually said that you felt that you could not give the public assurances about the current environmentally safe decisions or otherwise that are being made at the moment.

(*Baroness Young of Old Scone*) The problem with Cabinet Committees, of course, is that nobody knows what goes on in them really and so we welcome the co-ordinative effect of that Committee, but your guess is as good as mine as to what goes on during it.

51. So presumably if you have concerns you need to know who to send them to and where to send them to and know those concerns will be linked up with other equal concerns that might come from other departments or advisers or committees as well?

(*Baroness Young of Old Scone*) We have been delighted with the approach that Michael Meacher and the Department of the Environment have taken on this issue and, of course, as we report to DETR as an agency, that is our first port of call, but we do talk extensively to MAFF and to Jack Cunningham's office and to DTI and so no-one is in any doubt about what we think, but how that process then operates, particularly at Cabinet Committee level, I honestly cannot comment on because I have no knowledge of it.

52. I think many of us here are delighted with the response of Michael Meacher as well, but you had to write to the Prime Minister on all of this?

(*Baroness Young of Old Scone*) Perhaps I should clarify why I wrote to the Prime Minister. I do not know if you recall but I did it when the whole thing was running very hot and strong. For some reason Mr Hague decided to hijack the Prime Minister at Question Time one day on GM foods with the question why was he not listening to his statutory adviser, English Nature. The following week there was a similar bout at Question Time when the Prime Minister then quoted English Nature's call for a moratorium (which was the word we were using up until that time) and said that we had now clarified our position. We were not seeking a moratorium and at that point it all began to get very silly, so we decided we really needed to clarify for everyone what it was we were saying and that was the point of the letter to the Prime Minister. It was really to clarify that the word "moratorium" was actually unhelpful and what our true position about the research programme was.

53. I remember that day very well because it is the day I happened to have an Adjournment Debate on the same morning. But could I go on to the whole issue here. You talk about joined-up thinking and the need for joined-up strategies across all government departments. You have mentioned the Department of the Environment but how do you feel you work alongside MAFF because it is quite clear from your answers earlier that if you are giving scientific advice about the environmental concern on biodiversity and then decisions are subsequently being made which are then taken on board by MAFF which involve the field-scale trials when you have admitted that there is a grey area, what institutional arrangements do you have for working alongside MAFF, although I can appreciate that your first port of call is actually the Department of the Environment?

(*Baroness Young of Old Scone*) Perhaps I can ask Keith. My perception is that in terms of the detailed design of trials and some of the more detailed day-to-day working, that we work closely with MAFF and DETR. Most of these decisions are made in fora where there is quite wide representation. My concern more in terms of the interdepartmental co-ordination is that the role of bits of the interdepartmental co-ordination is rather less easy to pin down, including the role of No. 10 in this, but Keith can comment on it.

54. Before he does so, could I ask you in terms of the role of No. 10, would you agree that there should be some degree of transparency so that we can see where the various impacts are coming from?

(*Baroness Young of Old Scone*) I certainly think that in an issue as public as this, where there is so much concern, it would be of value if we were clearer on the process that was leading up to decisions. I recognise that this is an incredibly difficult issue for any government to tackle because they have so few really effective mechanisms to resist very strong pressure from the biotechnology industry, and I do sympathise with the Government in that respect, but I think that we do need a degree of transparency if we

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are going to understand why decisions have had to be made in the way that they are being made.

55. Who do you think should have that responsibility? Do you have new arrangements that could deliver that transparency?

(Baroness Young of Old Scone) I do hope that the interdepartmental committee is going to play quite a strong role in that because it is the mechanism we have at the moment for bringing together all the parts of Government to make decisions about the best way forward on this technology. It is not a scientific committee, which is why we need the over arching committee with experts on it, but in terms of political process it is the process we have.

56. And do you feel there is a role for yourself in terms of advising not just on the scientific basis for all of this but on the mechanism that could deliver your inputs into the scientific advice?

(Baroness Young of Old Scone) Certainly in terms of the scientific advice and the over-arching committee process we would expect to be able to be represented. Clearly, whatever happens, there is then going to be a political process which is not for us. We are there to advise on the scientific and ecological impacts, and the biodiversity impacts and there will be decisions that are more complex and more valuable that we are not there to make.

57. I did not want to cut you short, Dr Duff.

(Dr Duff) On the MAFF relationship we are pretty well connected with them in a whole variety of areas. On this particular area, the lead on the design and operation and management of the field scale trials is very much under DETR's lead but I understand MAFF are on side with that. The issue for us there—and it is wider than just field trials as such—is that ACRE is a DETR committee; the advisory committee on pesticides is a MAFF committee; and it is that linkage which we believe needs to be really effective. There are still uncertainties that we come across in some areas over pesticide applications for either experimental release or commercial release, and our view on that is that it would be premature to have a commercial licence for a pesticide designed specifically for a GM crop before the completion of the field trials for use of that GM crop. We would see an experimental licence being appropriate, but it would seem to us premature to issue commercial licences for pesticides tailored to specific GMs at this point. That kind of need for effective close ties is an issue we feel is an important one.

58. Is it one you see being resolved in the near future? Have you made suggestions about the kind of joint working arrangements you would like to see?

(Dr Duff) We have and we are engaged with the Advisory Committee on Pesticides. One of our officers advises the committee and we feed in those views both to the Pesticide Safety Directorate, to the committee itself and to the DETR side.

59. But do you feel your views are being taken notice of and that you can see some kind of early resolution of how that partnership arrangement is going to be instigated?

(Dr Duff) We have seen changes in the remit and approach of ACRE but we have not yet seen it on the role or remit of the Advisory Committee on Pesticides. We would hope to see that but we have not seen it yet.

60. Are you likely to see an announcement quite soon or is it not being addressed at all at the moment? Is somebody somewhere trying to resolve it behind the scenes?

(Dr Duff) I believe so but I have no idea when it might reach a conclusion.

(Baroness Young of Old Scone) I certainly know there is considerable discussion about the idea of an over-arching committee. I am not aware of the current state of play on the ACP discussion but perhaps we could come back and give you our current position on that.

61. Finally, when we are talking about working with other departments and other departments working closely with each other, what is your experience of the DTI particularly in view of the comments earlier about how we are only one voice in Europe and how much of our work being done in respect of WTO arrangements are done, if you like, not directly? Where, in your view, could we be improving things by having a greater, stronger, voice in respect of representations made to the WTO and in terms of DTI being a sponsoring agency on that?

(Baroness Young of Old Scone) Our responsibility as far as DTI is concerned is to make sure they understand what we are saying about the impact of this technology on biodiversity and the environment, and what we would want to see by way of arrangements and controls for the future. We have not played a role in terms of the much bigger issue of the role of the world trade agreement, other than to point out the fact that it is potentially going to prevent or could potentially prevent the sorts of arrangements we want to see put in place from being able to be insisted upon. We are, as a statutory body on biodiversity, a rather small player in the whole UK Government/European Union/World Trade Organisation debate about environmental conditions, for example, which is applicable not just across genetically modified organisms but across a whole range of issues at the moment.

62. What has your view been of the DTI? Have they understood the concerns you have been expressing about biodiversity?

(Baroness Young of Old Scone) I hope people are now beginning to understand them better. I think until quite recently there was comparatively poor understanding right across the spectrum of what the real impacts on the environment were. We came to a view about eighteen months ago and it is clear that we still need to keep on reinforcing that view and explaining it in detail. It is quite a complex issue and it is only when you go through it in detail that people begin to understand it. I was quite taken aback, I must admit, a few months ago at how little the real detail of that had been taken on board. That is now different; there is a growing perception that there is a real environmental issue here and we are seeing ministers across government departments recognising that it

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does need to be taken on board but they are remarkably ill equipped, because of the European and international situation, to be able to do as much about it as common sense would seem to dictate.

63. In terms of other departments and their understanding, do you feel the need for there to be some kind of funding for all departments to be able to flag up this issue of biodiversity and for, for example, the public to be able to take a greater part in decision making as well? Where is the funding for that greater awareness and greater input going to come from?

(*Baroness Young of Old Scone*) When we said earlier on we were not going to comment on things outside our remit I think we are straying perilously close to that divide! I have a personal view on this which is not an English Nature one, and I am not sure whether it is legitimate to give it.

64. We would like to hear it.

(*Baroness Young of Old Scone*) Perhaps I can give a health warning and a disclaimer. I do seriously believe that, with the sort of public concern that we now have on board, there needs to be a very long strategic look taken at how you can rebuild public confidence in genetically modified foods and genetically modified crops, taking account properly of the real risks and not trying to sweep them under the carpet. I think anyone—and I will not point any fingers but you could point fingers—who believes that this is a sort of temporary aberration drummed up by the press is seriously misunderstanding the mood of the British public. If I were running an NGO whose job was to popularise GM foods and crops, I would be looking at this as a five or ten year process of public confidence-building that would involve not only Government but the industry itself, and that would have to be based on reality not on perception, which would have to be based on being able to reassure the public that their concerns were unjustified and not simply sweeping them under the carpet. That is a personal view not an English Nature view.

Mr Baker

65. There is a tendency in government for each department to try and always have a philosophical position of its own, it seems to me, on how it operates so that the Department of Trade & Industry is traditionally in favour of free trade—or free-ish trade—and the Department of the Environment obviously looks at environmental aspects together but this issue, as you have said, goes across a number of departments. Apart from the lack of co-ordination, which is a separate point and which is being pursued, have you detected a different philosophical approach within departments? Let me perhaps put my cards on the table. I have detected from DETR a willingness to apply the precautionary principle, with Michael Meacher being very careful about things. I have detected from DTI a much less careful approach in the sense that this is a WTO/trade issue; this is all going to come in and we should be there; our biotechnology industry is very important and must not have constraints put on it, etc—that kind of approach. Have

you detected that sort of philosophical split across government departments?

(*Baroness Young of Old Scone*) It would be true to say that that sort of split is one that we detect across a whole variety of issues. Genetic modification is not different in that respect. There is an inevitable difference in sets of philosophies. The important thing is that all departments hear the same message from us about the real risks and potential benefits, and the measures that have to be put in place to guard against one and deliver the other, and that those perceptions are taken on board.

66. But that re-emphasises your need for co-ordination across government in an over-arching body, does it not, because there is no point Michael Meacher taking steps to change ACRE or put further regulation in if the DTI saw the pass on world trade rules?

(*Baroness Young of Old Scone*) Which is why the current process of co-ordination across government is interesting but opaque.

67. Lastly, did you have a letter back from the Prime Minister to your letter?

(*Baroness Young of Old Scone*) That is a good question. I do not know the answer to that. I do not think we have.

68. Given that your letter was public, if you had had one, you would have published it?

(*Baroness Young of Old Scone*) We were not actually expecting an answer; let's put it like that. If we had been we would have been harassing him before now for one, but it was really to put on the public record just exactly where we stood since practically everybody in the land was hijacking our point of view for their own purposes. I am pretty certain we have not had a response but I would not normally have expected a response for that.

Mr Savidge

69. As you are getting to the end of your remit, can you advise me on this? Given that there are English/Scottish/Welsh and Northern Irish separate bodies, what exactly is the advisory position? Who would be responsible for advising the Department for Overseas Development where obviously there is a very real interest because one of the biggest fears is that the developing countries could be most under threat perhaps of being exploited here?

(*Baroness Young of Old Scone*) We work very closely with our opposite numbers in Scotland, Wales, with the Department in Northern Ireland and with the Joint Nature Conservancy Committee which is the co-ordinating committee for all of that process.

(*Dr Duff*) Yes. JNCC have the lead responsibility in the UK conservation field for the overseas development aspects and the dependent territories, so the advice would come through them. In fact, however, the way that the process works is that English Nature just happens to have particular expertise in the GMO field, and we operate a lead agency function covering the organisations in Scotland, Wales and the JNCC, so

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[Continued]

[Mr Savidge Cont]

we would provide the advice to the JNCC and that would be the route by which it went to ODA.

Mr Baker

70. Are you satisfied that the devolution arrangements for Scotland and Wales are going to lead to no weakening of the controls which are there, available for government, for protection of the environment?

(*Baroness Young of Old Scone*) We are certainly clear that Scottish Natural Heritage, our opposite number in Scotland, is absolutely at one with the views expressed in the paper here today. Clearly the whole question of what is going to happen with devolution on a whole variety of fronts is quite interesting. We are pretty certain we will see quite considerable divergence in a whole variety of environmental and agricultural areas for the future. I would like to hope that the cross government integration process would be one that would be reserved, as it were, in the case of GMOs, but I think that is a real issue which we have not applied our minds to and we certainly will now.

71. You might get products from the Cairngorms on the South Downs?

(*Baroness Young of Old Scone*) Yes. We might get palm trees on the South Downs.

Dr Iddon

72. The media, it seems to me, has concentrated on the risks of introducing GMO crops. Although the benefits have been mentioned they have been played down I think, and you rightly said this morning that there are benefits as well as risks possible in the introduction of GMO crops. I commend you also on pushing the idea of split field trials rather than distant field trials. I think that is extremely important. However, in doing the scientific work, have you any views on who should actually carry out the crop trials and, whoever carries them out, have you any views on who should assess and how they should assess the risks and benefits of those trials?

(*Dr Duff*) The importance, given where we are with this whole debate, is that the field trials and the research is carried out in an entirely transparent way, and that it is done by research institutions with acknowledged capabilities and skills in this area. The process of letting the contract has been one of competitive tender, as I understand it, where a number of consortiums of research organisations and others have put in bids. I do not think a decision has yet been announced on the outcome but it is vital that the research is done, and perceived to be done, by organisations skilled in the area and that it is assessed through both the normal process of scientific peer review and by the regulatory processes that we have in place as well. I see no difference in general terms to the way that we need to address all of the science work. It needs to be transparent; it needs to be peer reviewed; and that, to me, is the key bottom line.

73. It is a bit like introducing a new drug which could have devastating effects, on the one hand, but very beneficial effects on the other. When drug clinical

trials are carried out, very careful protocols are drawn up by professional organisations. I have not heard much talk about protocols being drawn up for crop trials in the GMO area. Are you aware that protocols do exist and, if so, who has drawn them up? If they do not exist, do you feel they should be drawn up, and by whom?

(*Dr Duff*) The subcommittee of ACRE which has recently been established is looking in large part at the management of the field scale trials and they will be involved in discussions on protocols and procedures and so on. That is vital. There are also issues of the agricultural management of the crops themselves—both the GM and the crops they replace. There are, we know, initiatives in place through an organisation called SCIMAC—the Supply Chain Initiative for the Management of Agricultural Crops which is seeking to produce a code of practice for the management of these crops. We saw an early draft of this and advised that it needed to be modified fairly substantially to highlight the biodiversity issues more clearly. We have yet to see the final draft of that but we believe certainly that there need to be such codes. Given the position we have reached with public confidence and the public profile of the issue, there would be merit in ensuring that protocols that existed were ratified through a formal process, either involving the restructured Advisory Committee on Releases to the Environment, or the over-arching committee, but I think it would be need to be ratified by such an independent group to give it the credibility it would need.

74. Again, using the drug clinical trial analogy, as well as drawing up careful protocols for the trials, before the trials actually begin the protocol and everything related to it is submitted to an ethical body for ethical considerations as well. I do not hear any talk of a similar consideration being given to GM or crop trials?

(*Baroness Young of Old Scone*) Where issues of human health are concerned, which we are not concerned with, you might well want to read across from drug trial regimes the provisions for ethical consideration. As far as we are concerned, in terms of biodiversity and the environment, the important thing is that protocols clearly (a) lay out the conditions under which crops can be grown, the control conditions, (b) lay out the pre and post monitoring of the impact on biodiversity and, as a third requirement, demonstrate what happens if those conditions are broken. That is why we would be very keen to see these conditions and protocols having a regulatory basis so that there is some means of enforcement rather than simply being on a voluntary basis. The ethical issues are rather less to the fore in terms of biodiversity and environment; it is the straight science of what the actual impact is that is important.

75. With sustainable development there are obviously different dimensions to it. The two strands are the environmental strand and the economic strand and one can assess risks and benefits for both of those. How do you think we should weigh the risks and benefits for the two main strands of sustainable development in this area?

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[Continued

[Dr Iddon Cont]

(*Baroness Young of Old Scone*) I certainly believe that we do need to ensure that, in looking at the sustainable agriculture involving genetically modified crops, we want to take on board both the economic and the biodiversity issues, because there is a need to continue to produce food and a need to continue to have competitive agriculture with some of the social and economic issues associated with employment in the countryside. If you look at the state of British biodiversity in the farmed countryside, however, it really is pretty appalling. We have some species down to 10 per cent. of their former extent; we have some species that simply do not exist in whole swathes of the countryside any more where they used to be. For me, this is a pretty backs-against-the-wall time, to be honest, for farmland biodiversity. We have seen massive declines until we are not on a level playing field any more. We urgently need measures that will halt those declines and turn them round. The idea that one can be totally even-handed in the analysis is wrong. Biodiversity has been losing out in favour of intensification of agriculture for 30 years and it is time we really assessed what we want to see by way of the farmed countryside in terms of its biodiversity as well as its employment and social potential for farmers and its economic outcome. I should make the point that, if you look at many of the areas in this country, some of their key economic development is going to be centred on the natural assets that they have, their wildlife, their countryside and their whole potential for tourism and the leisure industry and, if you cannot see a skylark in East Anglia any more it is difficult to have people coming out, looking at the countryside and thinking it is something they want to pay good money for farmers to farm for. So it is quite a complex position but I really do think it is the time of reckoning now for our farmland biodiversity.

Mr Baker

76. So we cannot take any more chances and we must apply the precautionary principle, so the balance must very much be on not taking any more risks with biodiversity in terms of allowing any GM crops to be developed?

(*Baroness Young of Old Scone*) I would rather put it the other way round and say that the need is for as fast as possible assessment of the trial process and on-going insertion of that kind of trialling step-wise process into the regulatory regime for the future, so that we can move as fast as we can to produce GM technology that is biodiversity friendly or even biodiversity beneficial but, if there is any evidence that this technology is going to decline biodiversity further and faster, we simply cannot risk it.

Joan Walley

77. Very briefly, when we asked for any commentary you may have on labelling, your comment was that it really was not appropriate for you to comment on that. Given what you have said about how there is this great public concern about all of these

issues, it strikes me as slightly strange that you do not have any comments to make on labelling because, given all the needs we have for transparency, I would have thought the more we could move towards proper labelling of food and food production the better, and to go right the way back to the very beginning is a very important concept. I am just surprised you did not wish to comment on that.

(*Baroness Young of Old Scone*) We struggled quite hard in this country to get an adequate labelling system that would reflect conditions of growth rather than food safety issues and content issues. We have not cracked that at all for food generally. At the moment, when so much of the public concern about food safety is circling round the labelling issue, we have deliberately backed off from that because we think to try and label food as environmentally sound GMO food would simply make it even more difficult for the public to cope, quite frankly, especially since we have not found really effective ways of getting labelling systems going for biodiversity friendly food across the board. But it is an issue, and we will have to face up to, amongst other things, the whole future development of the organics industry. We are seeing organic production increasing dramatically at the moment as a result of the high level of premium and the new conversion scheme but, if pollen spread of the sort we talked about earlier is actually going to produce hybridisation into organic crops, for example, we do have a labelling issue there but that is very much, again, an issue that spans both the food safety and the environmental aspects.

78. I would have thought this could have been an catalyst to that. We have already seen, for example, in respect of manufactured goods some of our other European colleagues putting labelling on to do with environmental energy efficiency and things like that. I would have thought this whole issue could have been a catalyst and would have given you, perhaps, an opportunity to think how, if there is not that biodiversity aspect there now, it could be something to work on for the future?

(*Baroness Young of Old Scone*) One of my pipedreams at the moment is that we could invent some other form of environmental standards labelling for food that was not quite as rigorous as organic labelling but which perhaps was more of a halfway house between organic production and fully intensive production, but there are huge questions associated with it. At the moment there are umpteen different farm accreditation schemes run by the supermarkets, for example, and some by crop producing groups and there is no standardisation and they do require quite major monitoring of conditions and use of the sort you see associated with organic production if you are going to be able to reassure people that those conditions are, indeed, being met. To be frank, we just do not have the will within the farming industry to do that at the moment in view of their rather parlous state, but I would like to think that is something we could look at for the future. Unfortunately I have to get the plug in here for poor English Nature. As a government agency charged with biodiversity conservation, so much of our

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[Continued

[Joan Walley Cont]

resource is taken up with our statutory duties that our ability to act more widely in some of these areas is rather curtailed!

79. So it goes back to the funding issue I mentioned earlier?

(Baroness Young of Old Scone) Yes.

Chairman

80. I see we have gone on to Prayers and subsequent to that it is Treasury Questions which is rather important in view of your remarks about funding! I, therefore, thank you very much indeed for this rather valuable, and sobering, session. Thank you very much.

TUESDAY 20 APRIL 1999

Members present:

Mr John Horam, in the Chair

Mr Norman Baker
Mrs Helen Brinton
Mr Dominic Grieve
Dr Brian Iddon

Mr Laurence Robertson
Mr Malcolm Savidge
Joan Walley

Examination of Witnesses

SIR ROBERT MAY, Chief Scientific Adviser and Head of the Office of Science and Technology, MRS H FLEMING, Head of Biotechnology Team, and MR T COLES, Policy Executive, Office of Science and Technology, were examined.

Chairman

81. Good morning, thank you for sparing the time to come along to see us today. As you know, we are concentrating very much on how the Government is organising itself to deal with this very important and topical question of GMOs. We are very glad to have a copy of the paper which you produced in February, which I enjoyed very much, particularly your first sentence, "I think my views are shades of grey rather than the crisp black and white which characterises far too much of the debate".¹ We shall hope to crisp up your grey a bit during the course of this session. Thank you very much indeed for that. Is there anything you would like to say by way of any short opening statement before we actually begin to question you and your colleagues?

(*Sir Robert May*) Thank you; if I may very briefly. Firstly I should like to thank you for letting my colleagues sit here with me. I have brought the mores of academe into my Office and I do think of it as a group. Also it is good training for when they get to be permanent secretary. Secondly, at the risk of appearing narcissistic, I thought I would take about a minute to say something about myself because some of your questions will, I am sure, lead us but one's own experience colours one's view of things. I am by training a physicist. In the late 1960s as a rather precocious theoretical physics professor, I became interested in the formation of social responsibility for science in Australia and that led me to find out what I was being concerned about, which led me into ecology and I have, for the last 25 years or so at Princeton, Oxford and Imperial, been an ecological researcher with primary focus on causes and consequences of biological diversity. It is one of the few areas of my job where I often, though not always, have a sense that I know at first hand what I am talking about. The only thing I would say by way of amplification of the essay which you have is that I attempted in it to make a very crude and necessarily overlapping taxonomic division of the kinds of concerns which I and other people had

about GM crops and GM things in the food/agriculture area in general. One is food safety which we are not talking about today as I understand it. The other two are areas we will talk about today, one being the concern that genes, organisms, produced by GM techniques rather than conventional breeding techniques, may get out into other crops or escape into the countryside with possible effects. Both what is the possibility of that happening and why should we worry about it? Then the third category, which has nothing to do with safety but is one which concerns me greatly, is the degree to which this technology will further accelerate existing trends in the countryside which impoverish it. We shall be talking about the second and third of those.

Chairman: We want to concentrate at least on the environmental impact, although obviously we do not exclude anything in sessions of this kind if they come up and are relevant. We do want to start with the risks of adverse environmental impact.

Mr Robertson

82. I suppose this question really sums up the whole of the public's fear. What do you think are the main risks to the environment from GM crops?

(*Sir Robert May*) I lead off by repeating myself and saying let me first speak to the question of risks in the sense of novel kinds of superweeds, spreading insecticide and antibiotic resistance or other kinds of outcomes which you would conventionally define as a risk. Then let me under a separate heading, after we have discussed that, talk about the different kinds of questions associated with accelerating agricultural trends which are increasingly in the direction of realising the millennial old dream of agriculture of producing crops which no-one shares with us. This is bad news for the creatures and other plants in the countryside who would like to share with us. I see them as two different things. Firstly, under the heading of worries about risks as risks, the main set of questions one wants to ask is what are the chances that these newly produced organisms will either escape and spread into the wider countryside or, more importantly, exchange genes with other species in the countryside, or, for that matter, have effects up the food chain by transferring, having an effect on things which eat them,

¹ Genetically Modified Foods: Facts, Worries, Policies and Public Confidence—a note by the UK Chief Scientific Adviser, Sir Robert May. February 1999. Available at <http://www.open.gov.uk/> and from the Office of Science and Technology.

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[Continued

[Mr Robertson Cont]

or for that matter by introducing some novel component into complicated ecosystems, alter them by so doing. There is a set of questions which needs to be addressed under that heading and we and other countries have regulatory machinery for doing that. I see the questions as hierarchical. The first one is: how far does the pollen, or other material which could take the crop away from where it is meant to be, create hybrids with other things? How far does it spread? In creating hybrids are they likely to be successful in the wider countryside? Ultimately the question is: are we going to create more weed problems? That is one category of question. There is a set of others, but that is one which is centre frame and I would try very briefly to say the following about that. First of all, for those questions there is to my mind little which is essentially new about GM crops versus non-GM crops. Almost anything we eat today is something which would be unrecognisable by its early wilder relatives and that is the last 50 years of seeing more developments in that than the last 1,000. We do know that yes, pollen is spread in the wind, by other creatures; it depends a bit on the system which does it, so there are questions of how far the spread falls off. It falls off rapidly with distance but how? When it does create hybrids, often they are infertile but sometimes they are not. What are the kinds of things we need to be more alert for where we are going to create viable hybrids? Ultimately and most importantly are we going to produce things which not only are viable but in fact which are weeds, perhaps even superweeds? That is what the regulatory machinery is aimed at looking at and that is a set of questions which has been in centre frame and much discussed since the 1970s when the technology was first born. When the technology was first born in the 1970s, you will recall there was a voluntary moratorium on the part of the science community to deal with the same kinds of worries we are hearing again today. There was a big conference at Asilomar and then there was a very conservative and precautionary set of rules and all the sorts of conjectured fears that we hear today and things began to move forward. The first demonstration of rooting up a crop as a protest was in the 1970s with the strawberries in California. By this time something like 25,000 field studies of single sites have been done. The US regulatory analogue of ACRE has about 3,000 trials, some on multiple sites. Broadly—and I should be happy to amplify—one has not yet found something which looks like a serious problem, which is not to say we do not have to be continually precautionary and apprehensive. At the heart of it is the fact that most crops are wimps, most of the things which we govern. Our problem is helping them survive because they have been engineered, not genetically by one specific targeted gene but engineered over a long time, but particularly over the last 50 years, by natural selection to give us grain or whatever which has tended to diminish other competitive abilities. I could expand on that.

83. I am slightly alarmed that you say—I paraphrase—that no very serious potential problem has been uncovered. I am not an expert on this at all and

you are, but it rather alarms me that you would say that.

(*Sir Robert May*) Careless use of words. There is not an example. Were there a telling anecdote, then it would have been a centrepiece of concern to people and you would all have heard of it. I am not aware of an example of an actual superweed problem or a problem of transfer of antibiotic resistance marker genes, to my mind a foolish thing to have used as a marker gene, though understandable at the time. It is something we shall see less and less of in the future. It is not to say—here I am being grey ... At the heart of this is a really deep ecological problem. What are the characteristics of a successful invader? What is it which made rhododendrons such a terrible nuisance, or, you may say if you like rhododendrons, such an added decoration to the south coast part. I blush to say it but that is still a very ill understood question and it is at the heart of understanding the basic evolutionary questions about speciation. What is the balance of gene flow against selection which creates species? There are many unanswered questions here and what one needs to do therefore is case by case. However, it is against a background. There was a very interesting study many years ago by a chap called Baker who laid down what he had defined as some of the essential characteristics of a weed. You do not have to have all of them to be a really pestilential weed but he identified some 13 characteristics. I even wrote a little article about it myself back in the 1970s and the Asilomar days on the world's worst weeds and made a catalogue of a dozen or so of the world's worst weeds and asked what their characteristics were. They tend to have 10 or 11 of these characteristics which make a weed. Kathleen Keiller and other people have looked at UK plants. The average UK plant has something like seven of these characteristics. If it did not have any it would not be here. Crop plants on average have about five and that is perhaps arcane but it is trying to quantify the difference between weeds, average plants and the real wimpiness of crops. That does not mean that you must not be continually alert case by case that you might do something silly.

Mrs Brinton

84. May I take you back to the shades of grey and the crisp black and white on this whole aspect of gene escapes? It is the very shades of grey which certainly concern me and have concerned me so far. You say, "If such escapes occurred, are they likely to cause problems? In the case of 'superweeds', I think not". That is grey, is it not? Then you say, "... they would be resistant to a restricted range of herbicides, and could if needed be zapped with alternatives". Then you balance it again. You say, "Even so, neither the industry nor the public wants such transiently superweeds". They do not, do they? That is why, frankly, is it not, that there is such public concern, almost bordering on hysteria which can be very, very easily whipped up? In this very crucial area people actually do want a crisp black and white. Can you tell me, perhaps percentage-wise, not in shades of grey but in black and white, how significant the risks of environmentally damaging gene escape are?

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[Continued]

[Mrs Brinton Cont]

(*Sir Robert May*) You have to understand that I have spent my life as a scientist. The fact that I am in this area of science reflects my own concerns for the world I live in and which I want for the future. I bring to that an analytic approach which does not sit comfortably with everybody. Just as Truman said "Give me a one-handed economist", there is great need. Most really good scientists are not just two-handed but they are more like Kali, they are many-handed and I am very reluctant, even though the Office I am in at the moment may be one where occasionally one may wish to try to engage in the level that most people mean by "is it safe?". Those people think it is safe. You probably thought it was safe travelling in here this morning. You probably thought it was safe walking down the cigarette smoke filled corridor to get to this room. That was the danger you were exposed to this morning in my view. I am therefore reluctant to say to you that I am certain there is no risk. What I do say, however, is that the whole notion that herbicide tolerance will create a superweed is itself to my mind a rather peculiar concept because it is a superiority which is one-dimensional in the sense that it only confers a benefit in the presence of a herbicide. In most cases—and there are studies which show this—it carries a cost which means in the absence of the herbicide the thing does not do as well, but you cannot count on that because there are exceptions to that. You are not going to get from me, I am afraid, a thing which says I am certain about anything.

85. May I just press you on that? Would you not say that it is true, is it not, that the whole GMO business is such a revolution really that the general public really do want some certainty? How would you answer the fact that for example English Nature are taking a much more concerned attitude towards it? They are concerned over gene escape and modification of native species, particularly grasses. There is English Nature saying yes, there is uncertainty, but we are weighing in the black side of it; no, we are not happy. You are saying there is uncertainty but you might get that if you cross the road.

(*Sir Robert May*) I have said it badly. What I am trying to say, if you want a one sentence sound bite, is that I have no worries about GM technology producing superweeds any more than I have worried about ordinary crop breeding producing superweeds, which on the whole is a more likely way to produce a superweed. At the same time I think it is something which should be kept very carefully in the frame. The moment you keep it in the frame and have case by case studies you are connoting that you are not. If you are absolutely certain, you could dismantle the regulatory apparatus. Now you come to why English Nature are concerned. It is fair to say, though I cannot speak for English Nature, that English Nature's main concern, which is one I share, is to do with what we have not yet spoken about which is the changing shape of the countryside rather than a disaster from producing as it were a new rhododendron. We need to know more about the processes whereby things spread and there is endless room for learning more about that. However, at the same time I am not

worried about the consequences of the spread of either naturally or artificially produced by conventional means with its scattershot approach that in producing new varieties reshuffles about one tenth of the genome. I am worried about that if anything more than about the targeted one gene in it, but one needs to have a regulatory apparatus which looks at things carefully one by one both for reassurance purposes and just to be on the safe side.

86. Can you tell us any other concerns you have? What other potential direct environmental impacts could there be from the release of GMOs? We talked about superweeds. There must be others.

(*Sir Robert May*) The using of marker genes, antibiotic resistance things, although there is an understandable technical reason for why it was done at the time, was unfortunate and I welcome the later advances which are going to see us move away from that, at a very low level. Nonetheless there is an incredible worry that this could be one more small drop in the large bucket which is accelerating the evolution of antibiotic resistance. If you are an evolutionary biologist you recognise that you are always working in a changing world against a moving target so anything we produce will always provoke resistance to it. The question is whether you do it slower or faster. The question for antibiotic resistance more generally is how pressing the need is to do everything we can to slow it down or whether new advances in medicine will help us beat this problem and stay ahead like the Red Queen of the changing world. A precautionary approach is, not knowing the answer to that question, to do everything we can to retard the evolution of antibiotic resistance. That task, to my mind one of the least concerning but nonetheless it is something one ought to do, is to be concerned for this and thus the UK Government, for the application in Spain to plant GM maize which had a corn borer resistance gene, which we had no problem with but we did have a problem with the fact that it had an antibiotic resistance marker and we voted against it in common with a few other countries and it was not approved. There is another category of thing. It does not concern me much but I think we should take that attitude. Then there are yet others we could go into. Veering into food safety kinds of things but not exactly, some of the potential benefits of this are simply to make more nutritious foods. There are aspects of that which you have to be careful of lest you get people overdosing, like on something akin to vitamin B6 but in a way which lends itself to a less emotional defence of it.

87. I should just like to put on the record that I am much, much more concerned personally about antibiotic resistance than superweeds. I do not think that has fully come out before.

(*Sir Robert May*) May I just say on the record that I agree with you on this problem. I am much more concerned about antibiotic resistance than I am about anything to do with GM things and therefore I am concerned at this tiny corner of it but this is a very tiny corner of that large problem.

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[Continued]

Mr Baker

88. Do you sign up to the precautionary principle?
(*Sir Robert May*) Yes, but now we will immediately have a discussion on what we mean by that.

89. Perhaps you will tell me. Let me try to push you. Do you believe we are applying the precautionary principle in respect of the development of GMOs?

(*Sir Robert May*) Yes, I would regard the rather ill-presented series of statements I just made, about not being absolutely sure but being not worried but not 100 per cent. certain that there is nothing to worry about and therefore we should have a carefully scrutinised regulatory process which we continue to scrutinise carefully, as being an application of the precautionary principle. I regard our attitude to climate change, in which we have been one of the most effective countries in the world, as a force for what I regard as sensible, as a clear application of the precautionary principle. In the face of uncertainty, although the indications are that there is an anthropogenic problem, we have been a staunch advocate for acting now because it is easier than trying to act later when you are more certain. I do not see the precautionary principle in the form it is sometimes presented as saying if I can invent any credible worry then I cannot do it. If I applied that then I would not be here today because I would not have gone out of the front door.

90. Are you applying in your mind the precautionary principle in respect of climate change in the same way in which it is being applied in respect of GMO development?

(*Sir Robert May*) Yes.

91. The precautionary principle has not worked, has it, because we have antibiotics used as marker genes which you yourself condemned?

(*Sir Robert May*) That is an interesting way of putting it. At the time when people thought of putting these in as marker genes part of the reason for putting in marker genes was technical and part of it was precautionary so that you would always be able to identify what happened. We keep talking about this as though it happened yesterday. The history of this is really very fascinating because—if I may digress for a moment—at the birth of this technology the discussions we are having now were had in just such sometimes hyped up emotional environment in the north and west coast of the United States immediately after Asilomar and it was my job at Princeton to chair the group which dealt with the townspeople. I led the university into putting townspeople on a university committee for the first time and I can remember all of that. At that time there was no concern in Britain. Now we have a curious inversion which is itself an interesting thing to talk about. At that time people were not worried about antibiotic resistance. This was 20 years ago, remember, and it did not loom as it did now. The precautionary principle does not mean, it cannot mean, having tomorrow's knowledge today. It has to mean taking a best guess at what worries are but you cannot blame people in the 1970s for not seeing that this was going to be a problem.

92. However, you said a moment ago that there were "a lot of unanswered questions". That was the direct phrase which you used.

(*Sir Robert May*) That is what I say in common with any good scientist. Anybody who tells you they have absolute certainty about everything and they know everything about it is not someone to be trusted. It is a difficult line to take in a world which wants someone to give you absolute certainty. There will always be unanswered questions.

93. You mentioned risk. May I ask you to elaborate on that slightly. There is the risk that something might go wrong and then there is the scale of the disaster in an extreme situation of something which might go wrong. Something could go wrong and it would not be very serious and there might be a very small chance that it would go wrong. On the other hand, even if it did go wrong there is a one in a million chance the consequences could be devastating. Are you assessing both risk and hazard as it were?

(*Sir Robert May*) Not in quantitative terms. The question you just put is an absolutely central one. In so far as there are worries here, the worries are not that the average event is going to be a risk, that numerical classification I gave you, weeds, average plants, crops, is just an average statement. The apprehension is for the highly unlikely event, for the outlier, and that is why I believe we need a regulatory regime which looks at things not in terms of broad generalities but case by case. The American analogue of ACRE, the Advisory Committee on Releases, which has been operating much longer and has given some 3,000 approvals of field trials, looks at things and the basic thing it is trying to do is to try to make sure that the regulated article, that is the word, the GM thing, is unlikely to pose a greater plant pest risk than the unmodified plant from which it was derived. Implementing that statement is necessarily case by case, with a continual alertness to the thing which might be the curious outlier.

94. You mentioned your view—and I hope I quote you accurately; it was a very startling statement to me—that there was no difference between GM crops and non-GM crops in terms of GM crop development and conventional plant breeding; that was the comparison you were drawing. I have to say that is different from what the Food Safety Minister, Jeff Rooker, has said. I do not have the exact quote but he said that he accepts it is a different league. He accepts that perhaps in nature you would not have a gene from a rat inserted in a potato and therefore it is a different situation. Would you like to respond to that?

(*Sir Robert May*) Thank you for asking me that. In the attempt not to be excessively long-winded, even as I said it I realised this was too much of an over-simplification. If you look at the relevant paragraphs in the good essay, what I said fairly near the beginning was that my view is this. The ordinary tomato you buy in the supermarket has had naturally engineered into it by breeding a degree of pathogen resistance. In order to do that people, over time and in a quite deliberate way, have brought in other varieties, relatives of the tomato on the shelf, so closer to it on the evolutionary tree, but in order to bring in the

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couple of genes they want they brought in about 2,000 of the 20,000 genes in the tomato with it. On the one hand it is not the same. On the one hand conventional methods bring in much more stuff where you do not know what you are doing. On the other hand is the very targeted thing which enables you to focus on what you have done. So it is in a sense a help for what I kept saying: you have to look at things case by case so you have to ask what exactly we are trying to do. In that sense it is if anything safer but on the other hand you can bring things from further away on the evolutionary tree. Even that then—and you will find a parenthetic piece of pedantry in the essay which says one discovers that things are not all as different as we think of them as being. You can put for example a gene from a mouse which says make an eye and you can put that into a fruit fly, into the place where the fruit fly makes an eye and it will make you a perfectly good fruit fly. Generalities about it being far away and therefore dangerous are a little glib. My refined statement would be that in some respects GM technology gives you more need to be carefully looking at what you are doing. You can focus on what it is but you can be doing different things. If I were worried about producing a superweed or something like that, I would on the whole be more worried about the reshuffling of the genome. If I worried about the real outlier, then I would really be more focused on the GM crop.

Dr Iddon

95. I think we could both agree that changing agricultural practices during the last three decades or thereabouts, grubbing up the hedgerows, larger fields, increased use of fertilisers and agrochemicals in general, increased mechanisation on the farm, have had a very significant effect on the biodiversity. We discussed this with English Nature last week. We could agree on that, could we not?

(Sir Robert May) Absolutely.

96. My point is that the introduction of GM crops, if they are allowed on a commercial basis, particularly where herbicide and pesticide resistant crops are concerned, will again alter the agricultural practices. Do you think the direct effects caused by that are probably more significant than the direct effects which Mrs Brinton has just discussed with you like gene escape?

(Sir Robert May) In contrast to what I said earlier, I share these concerns entirely. If I may slightly rephrase what you said, whether or not the changes we can make with GM agriculture will on the whole, as I think they may, have the potential for being beneficial, slathering fewer chemicals round the countryside and so on, whether or not that can become true, that is not the intention. The intention is to take one more notch up in realising the dream of agriculture from its birth of growing crops which no-one eats but us. In the Middle Ages we only used to eat about one seed in three; we lost one third to pests and one third was for seed corn. Today we still lose about one third, but we are getting better and better. As we get better and better, it has the inevitable corollary that we can

document it very accurately in dramatic declines in bird populations and although the evidence is less definitive I have little doubt that it has similar impact on the underlying invertebrate fauna and often, as many of you know better than I, changing agricultural practices' impact on wild flowers and meadows. I have two thoughts here: firstly, whether the GM technology itself detail by detail is inherently going to be even worse, which I doubt, its aim, as long as it is purely directed by the industrial and agricultural industry, will be in the direction, understandably, pardonably, laudably even, of growing crops which no-one eats but us and that is bad news for the rest of the countryside. I hope that this particular moment will prompt us to do something which I would have wished and WWF and the Joint Nature Conservancy Council and a variety of media I have tried to urge for several years. I hope it will prompt us to discuss these issues which are not issues of safety but are political, social issues of the kind of world we want to live in and I hope we will find new mechanisms which will work against the perversities of the Common Agriculture Policy, which will acknowledge we have torn out one quarter of the hedgerows between 1984 and 1990 and even as we replace them we are still doing silly things. We are often buying the cheapest seed which comes from Poland. Well-intentioned people wanting to promote wild flowers are scattering geographically inappropriate packets of wild flower seeds. We should have a wiser and more sensible view of reconciling a competitive, efficient agriculture and the advantages that has for using perhaps less land with headlands, hedgerows, more designated areas, what you will, which will mean that we do not move more and more to a yet more "silent spring".

97. My difficulty is as follows. I agree with what you have said but if we are looking at sustainable agriculture to leave a better land for our children in the future and our grandchildren, where is the point which we really ought to be regulating? The whole point about this investigation is to determine whether the Government and the European Parliament have in place adequate regulations to protect us from the introduction of GM crops if we are going to introduce them again on a commercial scale. Do we regulate at the point of that introduction, or do we regulate at the sustainable agriculture level? This is my difficulty. People are crying out for increased regulations on GM crops but I do not see that as the fundamental point, bearing in mind what I said at the beginning of our discussion.

(Sir Robert May) I should emphasise that I am offering you a personal view now and not necessarily a Government line. It is one of the problems of the Government, having appointed me Chief Scientific Adviser, but that is my problem not your problem. That is why I tried to distinguish at the beginning and maybe the distinction is clearer in my mind than it is in other people's but it is a helpful distinction. The reaction of the EU or any Government agency is to look at regulatory things to make sure that no harm is being done to people, no specific harm of the kind we are talking about. It is much more difficult to get hold of machinery to ask questions about the kind of world

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you want to live in. My hope is that we will increasingly move to asking those questions about the world we want to live in, about whether retrospectively you cannot put in legislation not to grub out hedgerows as just one index of it, but I wish we had had it. That is what I want us to do, but that does not have the implication for any sort of slowing down of the UK being a player in the creation of a new wave of agricultural technological advance. The reason I feel that is partly because I do not think it is a sensible option anyhow and secondly because the new methods, if they are developed with a view to what is good for the Third World and what is good for the environment, have the potential to cure many of the problems of the current high intensity fossil fuel subsidised agriculture. But that is not going to happen if the driving force is purely industry and farmers regulated for safety. Ultimately I do not believe what was good for General Motors was good for the United States and I do not believe what is good for Monsanto is good for the world, but that does not mean that I am against the new agricultural revolution.

98. May I just pin you down on two very technical things so that we understand them before we proceed? The first has already been referred to and that is the marker gene. For those of us who might not understand science and technology adequately, could you just explain to us why the marker genes were introduced and why those specific marker genes were introduced and what kind of research might be going on currently which would lead to better marker genes in the future?

(*Sir Robert May*) You are asking a deeply embarrassing question because I cannot actually give you a statement with first-hand confidence. Subject to correction—I am tempted to say Mrs Fleming will explain this—in broad outline marker genes are put in partly so that you know where the bit you genetically modified, the cells you genetically modified, are so you can follow them and you want something you can easily identify because often the thing you wanted to put in was not something which was easy to find so you put with it a marker.

(*Mrs Fleming*) The use of markers is essentially a research tool. Researchers use markers as they are developing a product so that they can spot which of the products they have modified have the right modification in and which have not. For example, the organisms will be grown on plates which have an antibiotic on them and only the organisms will grow which are resistant to the antibiotic. Essentially it is a research tool.

99. Is there a better way of doing that research to avoid the antibiotic resistance marker gene?

(*Mrs Fleming*) There are other ways of putting in markers. For example, herbicide resistance is actually used as a marker during research. It is possible to engineer out changes which have been made like antibiotic resistance or herbicide resistance at a later stage in the development, but researchers are looking at different ways of using markers.

(*Sir Robert May*) It was not done purely so that you could keep track of it in the field, though that too. It was done so you could keep track of it in the laboratory. It was used because it was the easiest

technology available at the time, but in principle what you want is something which has no other effect, which just says, "Hey. I'm here". There was not to hand such a technology at the time but there is a deliberate effort these days to try to find some sort of marker gene which simply says, "Hey. I'm in this dish but not in that dish".

100. It was put in as a research tool rather than to track GM modified foods through the food chain onto the plate.

(*Sir Robert May*) It was both. It was done for both reasons but it was done primarily as the lab thing, but very conscious that it also had ... Again if you go back to the 1970s this was much discussed because particularly a more litigious country like the United States had provided a means of saying with quite firm assurance that this is a GM product.

101. That is the point I was coming to. We should all be delighted that these new foodstuffs could be tracked right through the process so that people—we shall come to labelling later—could be adequately assured that there is none in the food they are buying if they do not want to buy GM modified food. If that is the reason it is put in, fine by me, but not antibiotic resistant ones. There is a great need for something different.

(*Sir Robert May*) We completely agree on that and the community is coming to that awareness too.

102. May I look finally at the terminator gene? We have looked at gene escape and interference and cross-breeding with other crops in the vicinity of a GM crop. Presumably the terminator gene prevents that because it sterilises the crop. Am I right in saying that?

(*Sir Robert May*) Yes.

103. Is the intention of the industry, if we are going to have commercial crops, to put terminator genes in for that reason or to make the grower, the farmer, always go back to the same company who are producing that particular seed; which is one of the great concerns which the public has, particularly where the Third World use of GM crops is concerned and we are always told that these will be more advantageous to the Third World than they are to developed countries like our own.

(*Sir Robert May*) There is no simple answer to that. I had dinner the other night when I happened to be in Rome with the very interesting character who holds the patent on the terminator gene who was a North American who works in Canberra in Australia. Had I been more wise and alert I would have asked him this question as to why he did it in the first place. There is no simple answer. There is clearly a commercial incentive to produce something which stops people taking the seeds and then running away with them. There are two kinds of general global unhappiness about some ways in which this technology is developing. One is the one we are hearing about wishing to think it through more carefully in terms of the nature of the countryside, both specifically and more generally. The Third World concern, curious coalitions and meetings, is more that

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here is yet another step to a kind of financial imperialism as it were, industrial imperialism. My impression, though I am not at all sure, is that the initial motive may have been to answer, and it is clearly is a good answer, the question of how you can make sure these genes do not escape into the environment. Well, we shall just build in an inviability thing. It is quite a good answer. What you would ideally like is to build in a gene that was unfailingly a terminator for hybridised but had no effect in the pure line. Then it would solve one of your problems while not creating a different one. At the moment it does both and there is no doubt from some of the commercial practices that there would be people who would see it as a way of protecting intellectual property, which itself is a much larger question of the trade-off between commercial interest and altruism. It touches on a larger question which I hope to say a few words about right at the end.

Mr Robertson

104. We have talked a little bit about the risks. You obviously feel the risks are worth taking but are they worth taking when we have the situation, for example, which you talked about in your paper as being obscene? The Third World, of course, the starving millions, the fact that we actually destroy food in Europe and yet people are starving. So the point I am making is that people are not starving because there is a shortage of food, in fact in Europe we pay farmers not to farm, which is quite a strange situation. Is it worth taking the risks when we have that situation? Is it not odd? If you go down to the House of Commons restaurant you will find an organic option now. It seems to me that people are not actually wanting GM crops or food, they are actually wanting organic. That is the way it seems to be going. Given all that, are all these risks which you have described worth taking?

(*Sir Robert May*) It is a great question and may I again in my long-winded fashion give an answer in parts? The first thing is to say that if we are going to talk more globally then let us get things in perspective. The total amount of arable land in the United Kingdom is about 4.5 million hectares, none of which is under commercial production for GM crops. This year the number is uncertain but that is a nice round number. Next year the total amount of land under commercial cultivation of GM crops around the world will be about 60 million hectares, about 13 times the area under commercial cultivation in Britain. The question is about taking these risks. If I really felt apprehensive about these things then I should be extremely worried because what we decide to do here is almost beside the point. I worry much more—and this is something I shall come to at the end—not about our regulatory machinery, which I think is as good as any I am familiar with, although I say parenthetically that I am not as familiar with the German one as I ought to be and the Australian one is still taking shape, but I worry much more about the international dimensions of this. First, the question is moot. It is a risk which is being taken on our behalf elsewhere in the world and we ought to keep that in mind. Secondly, do I think it is worth the risk? Would you please distribute the food

handout? It is true that today the problem of feeding people well and on the whole the global population is better fed today than it was 30 years ago, is a problem of distribution not of production. That would not be true had it not been for the green revolution. Over the last 30 years we have roughly doubled the global production of food and we have done that by high yielding varieties which have down sides in that they require fossil fuel energy subsidies, they are more water demanding, they are more consuming of fertiliser and all forms of chemical input but that is how we feed the world better than we did in the past. Interestingly over the last 50 years the global life expectancy at birth has increased from 46 years 50 years ago to 64 years today and the gap between the First and the Third World has narrowed from 26 years to 12 years. Lots of good things have happened but there are unsustainable aspects to it. If you look at the sheet I have just circulated,¹ which is taken from a recent issue of *Science*, it has both global food production doubling and then it has the food *per capita*, assuming in this case that the fluctuations are averaged in one and not in the other. What you see is the hint, and I could expatiate further on this, of saturation of what we have been able to achieve in a manner which I think is unsustainable by virtue of many of its aspects of fossil fuel energy subsidies direct and indirect. If we look 50 years ahead to a not quite further doubling of the world population, and the slowing down of what we achieved with the green revolution in a sort of mechanical industrial revolution mode, then I do not see us feeding them. There are going to be more people in a world where much of what we are doing is beginning to turn this flap. To my mind that is the important question. The conventional argument for why we have to stay a player in this is that this is a vital industry of the future. We have played a hugely disproportionate part in creating the underlying science: are we going to lose it like we lost things in the past? That is an argument. I want to see us with a competitive, efficient agriculture, but to my mind an even more important thing is whether this technology is going to be used to work in a sense with our understanding of the way nature works to produce an agriculture which can feed the super-abundant human population but do it in a way which requires less input of pesticides, herbicides, chemicals, poured all over the countryside, that engineers in. We are not so worried about the risks of health because we are well fed. If we were in the Third World many of those benefits of health do not and are not reaching us; some are, some are not. We might look more benignly on a view that we could engineer vaccines into crops and do all sorts of imaginative public health things to make life better. My worry is that commercial forces do not necessarily drive that and that is why I wish us to be players on this stage in the same way that we have been influential players on the climate change stage. That is not a UK argument, that is perhaps an unduly idealistic argument for a civil servant, but I am glad you asked that question.

¹ See Annex 3, p. 44.

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Chairman

105. Before we move on to recent developments and what the Government is doing, may I ask you one question? You defined the dream of agriculture throughout the ages of producing food which no-one but us can eat, which I thought was an interesting definition. The ordinary layman, the non-scientists and perhaps this includes scientists as well, would think automatically that the object of agriculture is to produce enough food so that everyone in the world can be satisfactorily fed.

(*Sir Robert May*) If you are a farmer you do not want weeds growing in your crops, you do not want elephants trampling through and knocking them down, you do not want birds eating the seeds and sometimes quite unintended ... To my mind if I had to identify one worry about the changing shape of the British countryside at the moment it would not be GM crops, it would be winter wheat, winter oilseed rape and all the effects that has had; unintended consequences and adverse impacts, expanding some sorts of weedy plants and animals, weedy animals you might call them, and not others. These are larger questions that I hope this will prompt us to think more carefully about.

106. You seem to be defining the role of the farmer or the dream of agriculture to be super efficiency with nobody else included, which is slightly strange because I would have thought the farmer would want to produce in the first instance enough to make a living and make a profit and sell his goods satisfactorily, and then, if the way he does that enables field mice to exist and birds to fly, he is not bothered about that.

(*Sir Robert May*) Let me immediately qualify what I said by saying that I am not suggesting the average farmer is some sort of dreadful person who does not care for the countryside. I am grateful for the question to expose possible confusion from something I said. The people who live in the countryside are the people who care about it most and in a more understanding way than the sentimentalities that the city dweller often projects upon it. English Nature in particular has been exceedingly good in recognising that you do not serve biodiversity just through setting aside special sites of scientific interest, but you serve it best by working with land owners to do things which can serve nature as well. I am not suggesting any evil or narrow motives to farmers but nonetheless, having said that, in general if you are a farmer you want to stay in business. You have to remain competitive. If I give an acre for a given expenditure, you are ultimately harvesting half what your neighbour is, that is not good and the ultimate test of effectiveness is that for the investment you make in time, energy, inputs of one kind or another, you get out the largest harvestable crop and part of that is making sure you do not lose it to weeds or pests who eat it. If you are growing corn, maize, whatever—

107. You are really talking about the dream of the individual farmer *per se* rather than the dream of agriculture which must in a way be the larger one of feeding the world; the agricultural policy.

(*Sir Robert May*) We are getting into a curious discussion which I admit I am encouraging. If you go

back 10,000 years to when we began to invent agriculture and turn from being little bands of hunter gatherers, we did it partly accidentally; partly the crops used us to help them propagate themselves in a curious way, but at the time the aim was just to do well and then ultimately in a more competitive world do better than the neighbour. The effect of that is the figure of merit of agriculture, the first approximation, is production and that means not having it eaten by other people, other things, other animals.

Chairman: Thank you for clearing that up. May we come on to recent developments and the reviews which the Government is now conducting into this whole area and the field trials?

Mr Grieve

108. You mentioned that you had great faith in the regulatory structure. It was one of the comments you were making a little bit earlier. That in fact is under review at the moment, is it not, by the Government in respect of GMOs? You are also looking at the moment at the public attitude to bioscience and those two perhaps go together. I wondered whether you could update us to any extent on how that is progressing and whether any conclusions have been drawn from either the one or the other?

(*Sir Robert May*) Here I am going to be a bit “civil servicey”, that is to say I was extremely enthusiastic and played a modest part in the creation of the Cabinet committee to look at genetic things in general which was a very good idea. One of the first things it decided to do was to look at the regulatory structure and you have a diagram which we circulated in advance of the 15-odd different committees, most of them fairly technical, some of them broader. One of my earliest experiences in the job over three years ago was working with other people and with Ministers to help overturn the original Government decision to reject a select committee recommendation for a Human Genetics Advisory Commission, which I felt was something that there was real sense in having, something which was less focused on purely technical remit, which was more broadly constituted, representing an involved community, than being just a set of experts, serving a different role. I am very enthusiastic that we are conducting this review. The relevant committee is in fact going to meet tomorrow to talk further about it and I hope you will excuse me in saying that it would not be helpful at all in the larger sense if I were to tell you my personal hopes of what is going to happen. I do have them but you will just have to wait on that one.

109. I cannot draw you further on that one.

(*Sir Robert May*) I just do not think it would be a good idea. Every now and again I just develop the odd inhibition. We will be discussing it tomorrow and it is not going to be helpful if we are discussing it tomorrow against the odd headline which says that the Chief Scientist says he hopes this, this and that. It would be the last ministerial committee I sit with.

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Joan Walley

110. Amongst the evidence the Committee has had is a paper from the SCIMAC, Supply Chain Initiative on Modified Agricultural Crops. Could you just clarify a few points on the progress that this particular initiative has made? First of all, could you tell me who is actually funding the initiative and the proposals for the trials?

(Mrs Fleming) This is really a question you will need to ask Mr Meacher and Mr Rooker when they come before the Committee. As I understand it, and OST is not the department which primarily has responsibility for this area, SCIMAC is a self-supporting, voluntary organisation.

(Sir Robert May) I have no idea. You will have to ask them. I suspect it has input from the various departments responsible and who knows who else. I do know it does not have any OST money.

111. The reason I make the point is that at some stage we have to get an overarching way forward and obviously everybody's views have an impact on this. In view of the importance of these trials and the public interest there has been in them, could you tell us what the latest position is? Are you in a position to know that, in terms of the actual studies of the ecological and biodiversity impact of the GM crops, the farm-scale trials which are due shortly to go ahead? What is the latest position on them? I understand that permission has been given for them to go ahead. What progress has been made and what timescales are there?

(Sir Robert May) I give you my impression, but it really is a question you should ask Mr Rooker and Mr Meacher whose responsibility it is. My impression is that there is a very, very small-scale pilot thing going ahead this year with a view to learning by doing and in the meanwhile consulting widely, not just with people who are scientific experts in the area but consulting widely with various organisations, lobby groups and so on, with an idea of at least making sure that all the concerns that people would like to see addressed are being taken into account, which is of course no guarantee that some of the lobby groups would be happy with the answer at the end of the day but at least to make sure that all the concerns have been represented. My general impression is that the more full-scale things will be going ahead sometime towards the end of the year, but that is something which should be asked of Jeff Rooker and Michael Meacher.

112. One of my concerns about that is in terms of yourself being the Government's Scientific Adviser. Where does the whole issue of the environmental aspects of this come into that particular remit that these field trials actually have, the farm-scale trials?

(Sir Robert May) I see it as like anything else. I see my job as conferring upon me the privilege and the pleasure of interfering in anything to do with science anywhere in government that I feel is something I would like to be sure it is doing right. I must say that obviously would make the job totally and utterly impossible if it were not for the fact almost always one feels it is in pretty good hands. In this case I have talked to the people in DETR who were setting these

things up because I wanted to be reassured that there would indeed be this kind of preliminary consultation of the broadest kind for lobby groups as well as experts, to make sure that at least the kind of information you are gathering was the kind of information that in so far as possible everybody wanted, that you did not get trapped in the situation where a rather narrow definition was done and then you ended up after several years with something and people then raised questions which they could have raised at the beginning which they had not addressed. Having been satisfied that what we were doing was doing this with appropriate slowness and doing a very small-scale pilot this year but meanwhile consulting, I have gone into quietude again and will resurface when the process is gone through to reassure myself that it has gone well. This is a DETR lead responsibility but that does not mean I am not interested in it.

113. So you have interfered, if you like.

(Sir Robert May) I have not interfered because I am happy with the way it is going, but I have acquainted myself with what is happening.

114. You have had input in so far as the biodiversity and ecological aspects of these particular trials are concerned.

(Sir Robert May) I am happy that they are talking with the right people. I am not being evasive, it is just that I am more confident in other people's judgement about it. I have particular friends. One of the classic field studies, a very expensive, extensive one which addresses many of the points which are implicit and explicit in what you are saying was something which was published in 1993 which was done by one of my particular friends. A chap called Mick Crawley at Imperial College led the group and it was a study of two genetically modified oilseed rape varieties, one which had an antibiotic resistance marker, one which had a herbicide thing against the unmodified rape. It was done on a very, very big scale and it was the first scientifically published study on this scale of such a thing. It was done at four different habitats, each of them at three different sites with all sorts of different treatments and it was interesting in that there was not a single instance in which the unmodified oilseed rape did not do better than the modified ones. At the same time it was interesting because it was funded by a huge consortium called PROSAMO, which was a mixture of Research Councils and all the agri-business companies. If you feel that you cannot trust anything unless it has been untainted by industry money, which I think is a rather restricted view of the world, then you would not like this because it was public money, private money, all at arm's length and done by somebody who is a deeply committed ecologist/naturalist.

115. There are concerns, are there not, about who actually addresses what?

(Sir Robert May) Exactly; that is why I mentioned the example.

116. In terms of the time scale, going back to the farm-scale trials, what would you feel would be meaningful time scales for the results to be evaluated? How does that tie up with the situation that we are in at

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the moment with the review of the European Directive where we could easily be another three years before we have tighter regulations in Europe? What would you feel would be the necessary time scale as a scientist for meaningful results from these trials?

(Sir Robert May) I would not have an answer to that because I would say time scale would depend on the crop, the question, what you were doing. I could imagine in principle things where you could get an answer in a few months and I could imagine a few other things where you could not get an answer in many years. There is no general answer.

117. Is there no scientific advice to government as to what the time scale should be?

(Sir Robert May) I could not say what the time scale should be. I would want to know for what particular example. This particular trial seems to me to be going forward on a sensible time scale, but I can imagine other things where I would want something longer and at other times something shorter because it is not in the nature of it that it has an inherently natural time scale for all kinds of problems. There are some sorts of things which people might propose where I would feel it was a silly thing to do in the first instance. This whole technology can be bent to terrorist aims after all and I can imagine things you would want to do which you would not dream of doing in any time scale. Again, I emphasise that it is all against a background that more globally there have been some 25,000 such field trials of different things, of different time scales. Then again, against the current background of very understandable public concern, there is a voluntary moratorium amongst the industry on aspects of this. In more detail you should press Michael Meacher and Jeff Rooker on this.

Dr Iddon

118. I am from a growing community, responsible for growing all kinds of crops, and I know that even within the same large field there can be huge differences in the way things grow on that field. When we had English Nature here last week, they were very concerned that the crop trials might be carried out by comparing different GM crops planted on fields quite separated and they were very keen that we should grow GM crops side by side in the same field, the split field trial, with what we would regard as normal crops, although they have been interbred over the years as you have explained. Would you agree with English Nature or do you think we should carry out field trials with the crops well separated?

(Sir Robert May) I will give you a common sense, almost silly, lay answer. It sounds obviously correct, but if I had wanted to know that I would be guided by asking various people who are more expert in this, but it certainly sounds sensible to me. English Nature is one of the first places I would turn for such advice.

119. It also seemed, from the evidence we received from English Nature, that there might not be agreements between MAFF, DETR, SCIMAC and English Nature on this. English Nature seemed to put the view that there is no agreement on split field trials yet. Do you have any evidence on that?

(Sir Robert May) I am afraid you have me there. I just do not know. To me the really important thing is that all the people with all these views should be got together under the aegis of DETR as the lead agency, to talk this through and come to some view and all this should be done in a very open way.

120. The careful design of the field trials is critical and you would agree with that.

(Sir Robert May) Yes; absolutely, which is not to say there will not be, after you have done all this, as in everything in science, someone who does not agree with it.

121. However we carry out those trials, and I would hope too that they are split field trials, I concur with the view of English Nature on that, what do you think we should be measuring and how far should we be making the measurements distant from the actual GM crop?

(Sir Robert May) We are coming back to something I said earlier. You have to ask what it is we ultimately want to learn. We want to learn whether there is any risk that out of this will come some novel hybrid which is a nuisance. You can lay down all manner of guidelines, of surrogate questions you will ask, like making sure that you find less and less pollen, or whatever, escaping at further and further distances, testing the viability of the hybrids, testing their fecundity and surrogate measures of "invasibility". At the end of the day, you are going to have to be guided by a mixture of those kinds of multiple measurements, recognising that you are not trying to prove that none of the pollen gets out, because it will, and you are not trying to prove that in every case there are some kinds of things which will not cross, and other things like oilseed rape and wild radish or wild turnip which are probably an escape from an earlier trial, which will cross more easily. You are looking for a mixture of things like that, being alert to the conceivable as it were rhododendron, which as I have said several times earlier is *a priori* unlikely but for which you need to be continually alert. Or, if you want a one sentence thing, but in some sense this is in rather more general terms, the purpose of the trials is to compare the cultivation of GM crops with their conventional counterparts, just the same as the US thing which I read out to you earlier, to assess their ecological impacts, in particular the diversity and abundance of plants and invertebrates from which predictions will be made about impacts on organisms higher in the food chain, for example birds and mammals, which as you can see would fall far short of what I would ultimately wish us to be using at this time because if I found that they were more friendly than the currently often unfriendly practices to invertebrates it may have shown me that they were going to be an improvement on what we are doing with non-GM crops but it does not make me happy with a lot of what we are doing with non-GM crops anyway.

Mr Savidge

122. May I clarify one of the great current controversial issues? You mentioned the fact that there was a moratorium a couple of decades ago.

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[Mr Savidge Cont]

Would you recommend a halt to the planting of GM crops while these trials are going on?

(*Sir Robert May*) That is a mixture of politics and science. On purely scientific grounds, I do not see why one should do it. First of all, the moratorium would be on a time scale which was arbitrary, whereas I have just said different time scales for different things. Secondly, it is an extraordinary little England view of the world in which an area roughly one and a half times the size of the whole of Britain is currently under commercial cultivation with these things. With our more precautionary approach than most, possibly than anyone—the only reason I do not say we have the tightest regulatory structure in the world, the only reason I do not say that, is because there are some I am not familiar with—I would wish us to remain a player in this industry, both because it is scientifically hugely important and it is going to create a new agriculture for tomorrow and I want us to be part of that, and because I want us to come to the international discussions of this, which I hope we are more productively going to have than we had in Cartagena, from the same position of strength as we brought to global climate change. We would not have done what we did if we had been building on a no-science base.

123. Basically you are saying that rather than having some arbitrary time limit you base things on the results from research.

(*Sir Robert May*) I want to look at them case by case and I want to look at them against what is happening elsewhere in the world.

Mr Baker

124. It is the case, however, that the Government has initiated a number of detailed studies, for instance one on the indirect effects of GM crops on the environment. These are not due to report until 2003. So applying my precautionary principle, which you agreed with earlier on, surely we should wait until these fundamental studies which the Government has set up have reported and been analysed?

(*Sir Robert May*) It is a tricky thing. I think I have answered that syllogism already and it does not run because it is assuming what happens in Britain is the only thing we have to learn from. At the same time, however, I always come back, almost parrot-like, to saying from the scientific viewpoint I will ask the question about what we have learned in other parts of the world. That is what I would do on purely scientific grounds but one has a wider set of considerations to think about here, both from the point of view of the industry and from the point of view of Government, hence the scale on which this particular set of things is happening and the policy we have.

125. Are you prepared to see the planting of GM crops in advance of studies which relate to that planting being reported upon? May I just pick up on the point of biodiversity? You say we can learn from elsewhere in the world. Surely one of the arguments put by English Nature, amongst others, is that we are looking at a completely different situation in this country, which is not Little England—and I should like to say I am a Scotsman by birth though I do not sound

like one. Is it not the case that in this country in agriculture we have to co-exist? Agriculture co-exists with biodiversity. It does not apply in the United States, therefore it is not relevant to say that what we can learn from America needs to apply here. They have big prairies which are just agriculture over there.

(*Sir Robert May*) You are entirely right and country by country they are different. I meant not what you can learn about the wider indirect effect, but what you can learn from the narrower safety effect.

126. So there are things we could learn here and which the Government is studying and reports will be produced in about 2003.

(*Sir Robert May*) That is true. On the other hand, when we go to these wider questions, we are talking often about a different set of issues. We are talking about the effect of agriculture today and tomorrow on wildlife in Britain. My view is that properly handled, GM crops have the potential of being much more wildlife friendly than many of the things we have now and that many of the larger questions about wildlife are not even questions of GM versus non-GM crops, they are questions of reconciling efficient agriculture practice, like winter wheat, with the interests of wildlife. It does not matter whether the winter wheat is GM or not GM, it is going to cause changes in the countryside which are adverse to some of the things we care about. That has nothing to do with moratoria and so on. That is why I have tried to harp on this taxonomy of worrying about safety questions and, iconically, superweeds versus what kind of world we want to live in are often deliberately confused by people who share my view of the kind of world they want to live in, using superweeds as an argument of convenience. I think that is both scientifically unfortunate and I even think it is unhelpful for the countryside. What we really want in the long term is an agriculture which is sustainable and that has to mean an agriculture which works with our understanding of nature as distinct from what we have today, which is an agriculture which works with the brute force of fossil fuel energy inputs in the industrial revolution mode. I am not keen on things which diminish our ability to influence events in that direction.

127. No, but you said a moment ago that pollen will get out. Those were your words which I wrote down. Pollen will get out.

(*Sir Robert May*) For GM crops and non-GM crops; it always will.

128. The isolation distances which have been applied by the Government are shorter than the distances bees travel for example. Therefore if pollen does get out and is irretrievable, we are taking a risk, a very, very small risk perhaps in your judgement but there is a risk there, which is irretrievable and with consequences which cannot be undone should something go wrong. Is it not also the case, it is certainly the view of Green Peace and others, that if you have a situation whereby GM crops are planted, particularly if you are talking about gene flow from maize and oilseed rape, that that compromises organic agriculture absolutely?

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[Mr Baker Cont]

(Sir Robert May) That is a different point. If you have a particular set of cultural and religious beliefs and you are, say, the Amish and you live in a big enough country you can set yourself aside in a large part of Pennsylvania and you can live a life and run your culture in that large part of Pennsylvania uninterrupted largely except at the margins by the rest of the world. That is hugely more difficult in Britain and if you are wishing to be an organic farmer, you have problems already. First of all the definition of what we call organic farming is something we could talk endlessly about and best not get started on it. You cannot guarantee that the wind is not going to blow insecticide, herbicide things across your fields to some degree. You certainly cannot guarantee that crops that have been modified by techniques which shuffle much more of the genome than GM crops do is going to get carried or blown onto your field. I have difficulty accepting that using one particular method to put in one or two genes or maybe from further away is in some philosophical sense different from working with a crop where very high technology, increasingly over the last 15 years, has given us techniques for reshuffling about one tenth of the genome to produce new varieties. I do not see that in black and white as some sort of clear mathematical distinction and I just think that is a problem because there are people who feel very strongly about this. I respect their beliefs, I believe this is a niche market I should like to see expand and which will expand, but at the same time it already has problems in a small and crowded island.

129. What did you mean a moment ago when you said the technology could be "bent to terrorist aims".

(Sir Robert May) That is a different question yet again. As with almost anything we have learned, whether it is from physics in nuclear physics, whether it is from chemistry and various kinds of chemical weapons, or whether it is today and tomorrow from our ability to modify biological organisms, we are talking at the margins about using them for what are wholly good purposes and then we can have all the discussion we are having round the margin. All these things can be used for wholly unequivocally bad purposes. That is quite outside this debate and quite separate from it. If I were worried about things that is the sort of thing I would worry about. I actually worry more about chemical and biological warfare than I do about many other things. That has nothing to do with this.

Mr Grieve

130. We have been discussing field trials, split field trials, comparisons between GMO altered and ordinary organisms. SCIMAC say that there is currently no baseline understanding and inventory of agriculture to assess their long-term ecological and environmental impact. Forget about GMOs for one moment: there is no baseline for ordinary crops. On that basis, can we really start making an evaluation of GM crops without such a baseline or is it possible to do it without it?

(Sir Robert May) What you can do and what most of the rules try to do is just draw comparisons between

GM and the non-GM. You can do that with various degrees of precision, depending on the question you are asking. Again I have said several times, ultimately the question you are asking of a novel crop, whether it is non-GM or GM, is you are asking of these things whether they are going to be more successful in the natural environment when they get out of the field and that is something where we still have a lot to understand. I have said that several times. It is to be said against the background of something else I have said several times, that we must remember that by and large our crops, by virtue of the things we did to them to make them attractive to us, are pretty wimpy in the rest of the world. If you leave your garden alone, in six months it will not look like your garden.

131. As part of your remit, would the development of a baseline for the impact of existing agricultural practice on the environment be desirable and feasible or is that something which in fact is such a vast topic that there is no point even considering it?

(Sir Robert May) One of the things I have done both for my own interest and education and also because it was like taking a trip 20 years back in my own life to post-Asilomar Princeton, is spend most of the weekend reading through a stack of stuff, much of it written by friends in America and other places, and I would say in the chaotic and untidy way that science progresses we are moving in that direction.

132. It is happening of its own accord without needing to be pushed in that direction.

(Sir Robert May) Yes; pushing helps.

Mrs Brinton

133. Generally the tenor of the debate which I have picked up and I feel increasingly unhappy about is that it all seems to be something potentially really rather nasty but we are going to have it anyway. I should like to ask whether you can point out one real benefit for the environment of GMOs. We saw English Nature last week and they were at pains to say that even the pesticides arguments, that there would be a reduction in pesticides use, even those did not really hold up. What would you say to that? Would you agree with them or not?

(Sir Robert May) The easy way to meet with you would be to come along with a nice sheaf of stuff and read the relevant flag in each case and do a nice cautious Sir Humphrey thing.

Chairman

134. We sometimes get that. We are disapproving of that.

(Sir Robert May) There is much to be said for it.

135. Not from our point of view.

(Sir Robert May) Ultimately I think not from anybody's point of view. I think ultimately what we are talking about is public confidence in science to a degree. We are talking about a dialogue between the many, many publics, which are sometimes called the public and government and how it shapes policy and how policy interacts with public confidence in a topic

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which is heavily mediated and constrained by scientific realities, not all of them perfectly understood. So I have consistently tried to give you a sense, an honest feeling of things I am broadly happy about, why I am broadly happy about it, but I cannot say with certainty. It is a continuum of people in this debate and if I were a spokesman for a particular lobby group like Friends of the Earth, or if I were a spokesman for Monsanto, which I do tend to see as extremes of the debate, I would see myself as having a responsibility to give you a black or a white view. It is in a sense the difference between someone who in an imperfect way is trying to give you a sense of what somebody who is interested in how the world works and has a vision of the world they would like to live in sees this complicated unfolding scientific story. It is the difference between that and someone who sees himself almost like an advocate for the defence or the prosecution. You can take any topic. You can take any scientific topic and you can take an extreme position and you can cull the evidence to support that. Against that background, here are what I see as the benefits of it in broad terms because time is limited.

Mrs Brinton

136. Could you perhaps explore those benefits a little more, on wildlife for example?

(Sir Robert May) Yes, in broad terms. I actually have a handout from one of Kathleen Keeler's things, Potential Environmental Use; this is setting aside health benefits and anything else. One general category is reducing our dependence on spraying chemicals all over the place, pesticides, herbicides, fungicides. Why do you think, incidentally—another question, coming back to what motivates farmers—that GM soya and GM maize has been so rapidly taken up in the United States?

Chairman

137. Lower cost.

(Sir Robert May) Lower cost and better yield. Spend less. I have been trying to get actual data on herbicide use but it is argued: less herbicide use, more targeted herbicide use, less long-lasting herbicide effects. In general fewer chemicals in the environment is an environmental benefit. You can torture any one of these if you have a mind to quarrel with it. I shall read you quickly through them. You can improve the nutritional quality of food crops and that has a down side as well because you have people overdosing on certain vitamins. Decrease the dependence on chemical pesticides and so on. Skipping. Then there is a set of things which are not so close to the market: increasing crop yield by manipulating photosynthesis. Here is, if you look at what we do compared to the most efficiently photosynthesising plants, something where there is potential in a friendly way for the same investment of external inputs to simply get more plant. You can produce salt and stress, water, pollen and things. One of the real constraints of the agriculture of the future is that we already use about 30 per cent. of the world's water supplies in growing crops

worldwide. The estimate is that by 2020 or 2025 already about half the world's countries will for water reasons alone have to be net importers of food. They will have run out of green water and blue water to try to beat that. Some of these are immediate and short term and some of them are longer term. The ones which impress me most are the ones which are in the direction of growing crops which are more effective for example in fixing their own nitrogen so that we do not have to dump so much. Half the atoms of nitrogen and phosphorous which are incorporated in green material this year round the world will come from the input of fertilisers. That of course is partly because we will sequester something like 40 per cent. of all net terrestrial primary productivity this year for human purposes. If we can build things to give us the ability in a manner which is in general more sustainable and more friendly, less consuming of fossil fuels and other subsidies, that to me is the most important thing though it is not the thing primarily on the table.

Mrs Brinton

138. To me the most important element in all this is the safety and benefit of the consumer, as surely we have learnt from the horrors surrounding BSE? In matters such as BSE, coming back to this same thing, people do want certainty. That is not to say we should not explore complexity. We want something to come out of it. May I take you back to your own paper here and quote something which has troubled me and I should like some answers to it if you can. Potential benefits. You say, "The first potential benefit is familiar. There is a huge potential market for new GM 'agrifood' in Europe". Right. Cash, is it not? "The agrifood companies are, understandably, motivated by their wish for commercial success" you say a little later. Cash. Then you say, "But there is no guarantee that these economic processes will always act in the long-term interests of consumers" and I say that they must. If you cannot guarantee to me that they do, then I am not happy, I am not satisfied.

(Sir Robert May) You may have partly misunderstood it. This is a much, much wider question. I am saying that Adam Smith's invisible hand does not necessarily guarantee that the interests of industry, quite apart from safety issues, are going to be to do what is best for the world as distinct from what is best for them. I have said this several times and I do acknowledge that it is a wider and somewhat more inappropriately idealistic point maybe but to me the major reason why we have to remain a player in this is to try to make sure that these new technologies are indeed harnessed in the direction I just sketched as benefits, which is in a more environmental friendly, less relying on fossil fuel subsidies, more sustainable way to produce the agriculture of the future. Of the many, many things you can do, not all of those have an immediate commercial return, so that is what I mean when I say quite frankly in this document that I do not believe that the commercial motivations of Monsanto or anyone else are the guarantee that they will be developing the things which are most useful for the world as distinct from most profitable for them. This has nothing to do with safety concerns because

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[Mrs Brinton Cont]

their economic interest is most assuredly not to violate safety criteria and that is the one potential disaster for them. Look at the way we lost the whole jet industry when Comet went down. That is something where I trust the industry to be ultimately as concerned as we are because that is a real self-destruct for them. I have wider interests. It is not a self-destruct for them to be going for things which make farming cheaper and more efficient in the First World and to hell with the Third World.

Chairman

139. Should there be publicly funded research to balance the agrochemical industry research?

(*Sir Robert May*) With respect, that is a misreading, that is to say I believe the fundamental research which is done here will naturally be done mainly with public money. It is in the nature of it. If you look at the science base more generally it is primarily public money although oddly enough Britain has more than most in private money into blue skies basic research, almost five per cent of it in Britain, which is a quite large amount. It is in the nature of it that it will be done that way. Then, as it moves more towards application it will tend to be a mixture and that is inevitable and the way these things happen. At the same time, may I just get in one word because you have not asked me this question? It is a question of committee memberships and financial interest. One of the early things I did in this job was promulgate, and we have had collective ministerial assent to it, a committee of Ministers which meets regularly to discuss it, we have a first annual report on it, a committee of officials from all different departments to look at how we can do a better job and be seen to be doing a better job on guidelines on science advice on policy making. The central principles of that are openness and wide consultation, which do not always come comfortably in Whitehall. Also the guidelines are concerned to say you want to get the best people, you want to leaven them with some people who are outside the area, make sure you get a wide range of viewpoints and you should not exclude people by virtue of particular interests. Those interests should be clearly identified, but you should not exclude people. To come specifically to something like ACRE, I believe that should be a rich mixture of people who are scientific experts and people who have environmental concerns and it is in the nature of that that all those people bring extra baggage to that. There will be many people whose deep concern for the environment has understandably and praiseworthily expressed itself in being for example organic farming people, which will give them a commercial interest in particular kinds of outcomes. There will be people whose interest in the subject has expressed itself in being scientists who work in a department where there is money of a more general kind because it engages them with the intellectual enterprise from commercial companies. You have to make that plain but I do not see how you get the committees without having that multitude of interests. One of my own graduate students works for Monsanto, one works for the Wilderness Society, one

for the Environmental Protection Agency and two work in zoos. That is how it should be.

Mr Baker

140. Given that makeup of ACRE over the years have you seen any evidence of undue influence by the industry in any decisions taken by ACRE?

(*Sir Robert May*) No; I could not in fairness claim any acquaintance with the 160 things they did, but I have not the faintest flicker of an instance of that and the fact that they have approved the whole 160 which were put to them, albeit with many referrals and revisions, is explainable too. It is often said that proves that they have been captured. It equally, however, proves that just as most of these agencies in any country have approved most of the things which come to them, right since the days of Asilomar in the 1970s, I think it proves in a rather interesting way that this is a subject unlike others in science where the community itself from the beginning saw that there would be questions and worries and has from the beginning taken a pretty conservative approach to things. It can alternatively be read, and it is how I read it, that we have a good regulatory structure and people do not bring silly things to it and even when they bring very sensible things to it they are very often referred for further refinement.

141. That is a construction on what happened. Some of the public at large would see a football score of 160 to nil as a rather one-sided football game.

(*Sir Robert May*) That is a curious analogy, if I may say so.

142. Do you know what the position is with other European countries, other EU countries with the counterparts to ACRE? Have they been turning down applications?

(*Sir Robert May*) I know the US and I am not familiar with Germany and I am not familiar with other European countries.

143. Can you explain why Michael Meacher has decided to change the membership of ACRE?

(*Sir Robert May*) Very easily; the Nolan rules. At this point it said that 10 of the 13 were up for change and Michael did other things which I think were wholly exactly what I think is the right thing to do of widening the remit of ACRE.

144. Do you think we should have a stakeholder forum as a means of airing discussions about the competing interests in this field?

(*Sir Robert May*) That is part of what is up for discussion on the reconfiguring of things and it would be unhelpful if I gave you my private view.

Joan Walley

145. May I turn to what kind of strategy we should have in respect of GM food? You mentioned just now that we have to be a player—I think I am quoting you correctly—to make sure that we can harness the benefits of GM for the future. It just seems to me that we have not been very successful in harnessing those benefits, given that we have not been successful in

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requiring the United States to segregate soya and maize at source. Could you perhaps just comment on that first of all because I am sure that is part of the whole debate about the future strategy we should have.

(*Sir Robert May*) For once I can give you a short answer. I completely agree with you.

146. I take that as a yes. Thank you for that. That then raises the issue that if we are going to have a strategy as far as GM food is concerned, we have to do it both at a local level in the UK, at a European level and at the level of world trade so that at each stage, and also because of concerns about international development as well I might add, each bit of our strategy is consistent with every other bit. How do you see the various incompatibilities fitting into that strategy which we should now be devising, given that we are already so out of sync with the strategy in the US where free trade without any regulation whatsoever rules okay?

(*Sir Robert May*) First, I think that our strategy of requiring labelling of food which in a sensible sense can be said to be GM is entirely correct. Nearly all the time we have been talking about what I think the scientific facts are, what the scientific uncertainties are and I have been expressing my opinion. If we had talked about food as such, which we have not, I would have been telling you I do not have worries about that. That is one part of the debate but the other part of the debate is public confidence in this and public confidence in this necessarily involves people being able to have a choice. I think labelling food so that people have a choice is just hugely important. It is something which it is right to do in principle and it is the way forward in a debate which ultimately has to be in a sense about hearts and minds over time. It is made difficult in that we have a much more stringent approach to this than other countries. Then, as we reach out to Europe, and there are still directives—I can never remember the numbers on EC directives—in place, I would hope that we and others would influence people in Europe in that direction. Meaningful labelling mind you. Things where you are back down to the rennets for cheese which are exactly the same biochemical I do not regard as meaningful labelling, in fact it is a good thing. The US in this on the other hand is at the moment an extremely important outlier and one possible way forward is to persuade some of the larger companies that their own longer-term international interests lie in recognising international concerns.

147. Would you accept that voluntary regulation of that is not really going to be as effective as having a strategy?

(*Sir Robert May*) There is another huge set of problems. The WTO problems. This is a huge set of problems. The ideal resolution would be to avoid them by having labelling become more of a possibility and failing that one simply has a difficult tension. We have it in other things, not least bananas, but this will make bananas look very small.

148. I could not agree with you more. If we are looking at a strategy which is consistent right the way across the board, how then do we address the concerns

of biodiversity and environmental issues, given that that is not really the concern of the people concerned with food safety? How do we get a consistency, an integrity about the way in which at every level we are providing a way forward when there are so many public concerns already? Does this not come back as well? You talk a lot about scientists and about the importance of science. Are we not really talking about perhaps one lot of science which is science *per se* and another lot of science which is perhaps science for the earth?

(*Sir Robert May*) The vision which I have articulated several times with varying degrees of coherence for a Britain—and I take your point that Britain is different—a small and rather floristically and faunistically depopulated place, an entirely hand wrought landscape but a place which is really very cherished by many and how we reconcile an efficient, competitive agriculture in a world which is inevitably changing whatever we do with the preservation of the diversity of the countryside we have, is something which does not, as you say, easily fit into the discussions about regulations and, as it were, labelling. I would hope that just as I believe English Nature has done a lot in the ten years I have been here, if you look at surrogate measures like the rate of interference with or partial destruction of Sites of Special Scientific Interest, the record on the one hand can be read depressingly and on the other hand as one of steady improvement achieved by working with landowners. I recognise that it is waffling, that it does not have the crisp definitiveness of some of the regulatory things which are nice and relatively straightforward. I would hope that out of this we would seize an opportunity to think more deliberately about the social and political questions of the kind of countryside we want and the kinds of things we need to do and the regulations we have to have which on the one hand do not impede the survival of an efficient and competitive agricultural industry but on the other hand are more fully recognising what changes can be made for the better at preserving what we have.

149. Would you agree that one of our goals as part of our strategy should be that move towards a sustainable agriculture? Would that not include far more support for organic production as well?

(*Sir Robert May*) I believe the GM thing—as I have said several times for specific reasons—is a step towards more sustainable agriculture. The trouble with organic agriculture is that it is great for us but it is not going to feed the world. Even the much quoted things recently in Nature show that with natural fertiliser you can do okay. You just basically need twice the land to grow anything. It is something I would wish to see encouraged more than it is in Britain, because it is land friendly, but it is not the answer. You could not feed today's population of the world with the agriculture of the past century and you are not going to be able to feed the population of 2050 with today's agriculture.

150. There are many, are there not, involved in international development who dispute the facts that it is a matter of less production which is actually causing the food shortages, it is far more the distribution aspects?

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(*Sir Robert May*) I said this earlier: today's problem with today's production is a problem of distribution. Today's production is twice that of 30 years ago and that has been achieved quite explicitly with the green revolution which is itself not sustainable. That is a central overarching fact that must not be forgotten. Tomorrow is uncertain whichever way you look at it and I see this as one of the tools, wisely handled, which gives us hope for a sustainable global future. It is a much more idealistic and broader argument with the nuts and bolts things we have been talking about for the UK.

151. Moving away from the terms of reference of our debate today, there are many people, for example in India, who are concerned about their relationship with the land and the way in which, because of the whole question about patenting this kind of particular production, it could completely destroy agriculture.

(*Sir Robert May*) I touched on that. The whole terminator question has huge implications for agriculture and there again I want us to be players in persuading companies that these kinds of things are not in their interests. In the perfect world we would have the terminator which terminated the hybrids but not the pure lines. We have had that discussion.

Mr Savidge

152. There has been concern that the present regulatory system does not take adequate account of the wider, the cumulative and the indirect effects of GM crop production, proceeding as it does on a case by case basis. The ACRE has recently made a start on this question. I was wondering whether you think that their sub group is an adequate answer to this and whether you feel that ACRE has the right expertise to assess the influence of GM crops on agricultural practice. Do you feel, given the new remit for ACRE, that there would be an intention to review its previous decisions?

(*Sir Robert May*) The one thing I will say is that the widening of its remit was a thoroughly good thing. At the same time, the wider implications of the question come in. As I have said before, it would not be a good idea for me to give you my private views of what I hope personally—and I do have such hopes—will come out of the review of the committee structure.

153. Given the relationship between GM crops and bioscience and both the individual importance of those but the combined effect of those on the wider environment, do you think that there is sufficient coordination at present between ACRE and ACP?

(*Sir Robert May*) I have a superficial answer which says yes. I know more actually about the committees on the health side. One of the things which immediately concerned me, way back, on the health side, when we created the more general Human Genetics Advisory Commission, was the question of how the more expert technically oriented committees interface with the committee which asks larger questions and is constituted more of lay people. There I was thoroughly reassured of the way the chair people got together, of the fact that the whole notion that efficiency means no overlaps as well as no gaps is

actually misleading. You want the right amount of overlap. My impression is that those two committees function well, but certainly that is one of the many questions which are feeding into the review.

154. English Nature and a number of the other witnesses we have heard, have suggested to us the need for an overarching committee, both to overlay the current present structure but also to give advice on the strategic issues which cross the boundaries of existing committees. Do you think that such a committee would be a sensible solution to that problem?

(*Sir Robert May*) It is very difficult for me not immediately to give my opinionated view of all this which would be reasonably popular apart from anything else but I say again, we shall see what comes out of the review of the committee.

155. Dare I perhaps ask whether you could suggest to us, when we are talking about strategic issues, what you think the wider strategic issues are?

(*Sir Robert May*) Many of the things we have been talking about. They ultimately go all the way to the thing I keep wanting to talk about which other people do not seem quite so interested in which is going beyond Britain to think of the future use of these technologies on a global scale. Many of the things which concern us today, whether we are talking the potential dangers of xenotransplantation or what are the regulatory rules about cloning or resistance to antibiotics or all the questions we have been talking about today, are ultimately questions about things where if one country really screws it up, that has done it for all of us in many cases. Xenotransplantation and producing superweeds and so on; maybe cloning is much more purely an ethical thing. Ultimately all those are issues where you want international rules. Certainly antibiotic resistance is one where it makes little sense for one small country to stop feeding antibiotics to farm animals if everybody else is doing it and the action there very appropriately was to press, as we have, with others, for EU-wide legislation and ultimately you want global legislation in this as in many other things. Easier said than done. Many of these issues are things where the ultimate answer has to be a more international approach and that incidentally is where the lobby groups are very helpful because many of these environmental groups are themselves of global reach and coordination in a way which is hugely helpful.

156. Given your previous answer you may not want to answer this at present but it has been suggested that the giving of advice and the case by case regulation should really be separate functions. Could the provision of an overarching committee possibly be a help to resolving that problem?

(*Sir Robert May*) I just say the same thing. The only thing I can say is that one of the first things I did was inherit the Human Genetics Advisory Commission which is not exactly the same as anything else, everything is complicated, but it is broadly the same issue. A select committee had recommended it to Government, the Department of Health and others had said they did not really need it and one of the first things I did, working with many other people, with

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[Continued]

[Mr Savidge Cont]

some new Ministers and others, together, was to overturn that decision. It gives you a functional indication of my mindset.

Dr Iddon

157. Can we look at some of the public concerns before we finish? At breakfast time this morning I went to a meeting which lasted for one and a half hours on genetics and the presentation was by Professor Byrne who is Professor of Clinical Genetics from Newcastle University. He talked about the use of genetics in medicine, curing or at least giving people who are marrying or breeding children adequate genetic information on diseases like sickle cell anaemia, cystic fibrosis, Hodgkin's disease, and by the end of this presentation all of us were quite amazed and stunned by the advances which had been made on the medical side of genetic engineering. Why is it do you think that they can get away with it with the public on that side and yet this morning you have heard people like Mr Baker and Mrs Brinton, and there would be thousands of other people outside this room, who are very concerned about the same kind of thing going on in food production?

(*Sir Robert May*) I have every sympathy with your colleagues and there are at least two differences. One of them is the circumstances in which we, a very privileged set of people in a very privileged country, find ourselves in that clearly we are all going to die one of these days and we would all like it to be later rather than sooner so we are interested in things which can go in that direction. On the other hand we are perfectly well fed, we can all get by perfectly well, we have food surpluses, we do not need these things. Ultimately this differential concern to my mind reflects the robust common sense of most people, which is: why take a risk, however small or conjectural if you do not need to?

Mr Baker

158. Quite so.

(*Sir Robert May*) Then there is the second question. Why do we feel that way, why do we feel so apprehensive about some of these food things, echoing in almost the same words a discussion which was held and has passed in the United States 20 years ago when you do not get a flicker there? Part of it is the reason you gave. In the United States it is either a dirty great big national park which you are in or it is prairies and you fly over them. A large part of it is also because we are still scarred by the recent experience of BSE and the way it was handled.

159. Do you agree with me that Monsanto, in trying to advertise the campaign for GM crops did more damage that good in this issue?

(*Sir Robert May*) Absolutely; absolutely. It is not for me to go on about this but I think their own purely narrow interests are not being well served by some of their current adverts. The problem is an extremely interesting problem of trying to engage people in a real understanding of what is going on and yet there are those who believe that if everybody knew more about

the science there would not be a problem. However, in fact there are other studies which show that in the countries where people know most about science, not just little factoid questions but deeper questions about the nature of the scientific method, in the countries which show best on that—and we show very well in that league, for all the fact that we could all do better; Denmark tends to be first, we come second or third—you ask people whether they are worried about the advances of modern science and the Faustian bargain and the countries where the people know most are the countries where people worry most and I think that is how it should be. It is good. It makes life difficult for people like me but that is how it should be.

160. Finally a question on labelling. You make the point in your essay, which I read with interest, that GM characteristics of the crop can be lost during the processing. Then we are into a discussion about threshold levels of GM modified material in the final product on the plate and the whole question of labelling. Would you like to give us your view on labelling and threshold levels? I believe in labelling. I think the general public should be given indications as to whether they are buying GM modified food or not. Then we have the whole question of residual levels from storing GM modified crops in the same bins as other crops and so on. Would you like to give us a view on those aspects?

(*Sir Robert May*) First let me say again that I think labelling, although most countries do not do it, but I hope they increasingly will, is hugely important both because it is right and because I see it as the resolution, if there is one, of current apprehensions, people able to make choices will be ultimately, on what timescale I do not know, having to make choices which will involve price as well. That will then motivate people to ask what the experience is, whether there have been any worries as distinct from the somewhat over-hyped, or curiously misrepresented stories as in the case of Pusztai and Rowett. There is both a reason of moral principle to do it and I also think there is a public confidence, public understanding reason to do it. Then you come into the nuts and bolts of doing it. There are some things where what is on sale is a product which has a particular clear genetic modification in it which is still there in the product. It does not worry me but you have a right to be worried and we should label it. There are other things and you go down a continuum; there is no sharp division. You come down to the thing I touched on earlier, different kinds of things such as using an enzyme which is just a chemical and no-one could tell, government chemists could not tell, whether that enzyme came from a calf's gut or whether it had been produced by GM techniques, it is just a chemical. In fact you probably could tell because it will not have the occasional contaminations that it would have from the calf's gut, just like tissue-grown insulin or rabies shots, which are not as bad as they used to be because they are less likely to have other stuff with them, where there is no reason at all to label it, or the refined oil from soya which has no DNA, no protein in it, but then there is a slippery slope. What if you have taken lecithin or something and squashed it all up so you have

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[Continued]

[Mr Baker Cont]

fragmented the DNA? At what level should you label it? All that against a background that we are all the time exchanging all sorts of stuff in our gut and we have been trying for cystic fibrosis to introduce genes using every technique we know to try to help people and failing. Nonetheless, people have the right to know if it is there, although labelling things where it is meaningless is silly, but where down that slope do you draw the line? I have no simple answer to that and ultimately it is something you would like to be able to consult people widely and have some sense of what the common sense of the customers would like it to be.

161. Are we going to be able to give the general public the confidence that the scientific backup for the labelling is there, in other words that we will have a very robust labelling system that the public can believe in?

(Sir Robert May) I hope so.

Mr Baker

162. I hate to go away without questioning you one step further on the "feed the world" line which you have given us this morning because it is a very important aspect of it. In some ways you have set that—I do not want to misrepresent you—as your justification at least for some of what is happening.

(Sir Robert May) Sustainably feed the world.

163. You understand of course, coming onto public concerns, that many of the public are wary of wonderful solutions. They have had nuclear power which was going to be too cheap to meter and everything else and turned out to be a white elephant rather than a great white hope over the years. I have to tell you that when I met Monsanto they did not claim that their products will feed the world. They do not put that as a claim. When I met them they claimed other things for their products but they do not actually claim that particular attribute. How can you explain that many of the developing countries, including India and others, are actually very opposed to this GM technology? They do not see it as a solution for their countries, they see it as a threat to their indigenous agriculture.

(Sir Robert May) Distinguish between the potential of constructing crops which work with nature rather than against it with the aid of unsustainable chemical and other fossil fuels, energy subsidised inputs, which is what I have been talking about, and a move away from traditional cultures which shattered more by the input of large seemingly imperial external other interests, which is what Monsanto represents, paradigmatically, when it is going to sell you seeds which are inviable year to year. There is a distinction between my, you may say, "science fiction" vision of how the world may be in the year 2200 and the immediate present, of the threat, which even in the First World worries me, of centralisation of particular technology in the hands of an organisation whose

interest is in its own financial future not the world's. I am saying one thing. I do not expect them to be interested in that although wiser public relations, which is not what they have been good at, would at least say it. I want us to move to machinery, and frankly I am non specific about it, I am looking longer term, but I want us to be taking the same first steps towards machinery which will put in place international things that help us direct the potential of these technologies into doing the things I want them to do as distinct from being driven purely by what will sell the seed to a farmer.

Joan Walley

164. Earlier on you spoke at great length about the importance of the climate change convention and the role which the UK had had in that. It seems to me that the difficulties which are there are exactly the same difficulties which apply to your very last sentence, which was all about how on an international basis we can actually have environmental agreements in place which match and dovetail and balance the international trade agreements. It seems to me that is a fundamental issue which we have not really cracked yet and certainly science has not had that input into.

(Sir Robert May) Two quick things. Firstly, I am under no delusion that what we have achieved in climate change at Kyoto and since then is anything other than the first slow beginnings of the turning of the wheels as the train begins slowly to move out of the station. Small in some sense though that achievement is, if I may quote Chairman Mao, "the longest journey begins with a single step", and it was hugely important and actually achieved against the odds. It is a beginning and we shall go on from that. The gulf between my hope for the world in the year 2200 and what we are talking about today also begins with small steps. One of those small steps is a recognition that the UK Government's interest in this is first the safety, you could almost say the psychic health, of the population. It is not really about food safety, it is about not being upset all the time. It is not about using this as a metaphor for something. I am not joking. It is partly making sure that we are not merely doing the right things, recognising the world's reality, but we are seen to be doing them and part of that is wanting to be part of an agriculture that is going to come and not be left behind, not create it and then not have its benefits, but part of it is taking a more idealistic view of the future. All that is what I want us to be doing and I have gone on and on about the last bit because other people are not going to talk to you about that and part of my job is indeed to lift sights beyond the immediate horizon.

Chairman: Thank you very much indeed, that has certainly been a non-grey and very colourful performance and fascinating from our point of view and I hope the audience's. We are grateful to you and your colleague for coming along today. Thank you very much.

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[Continued

ANNEX 1

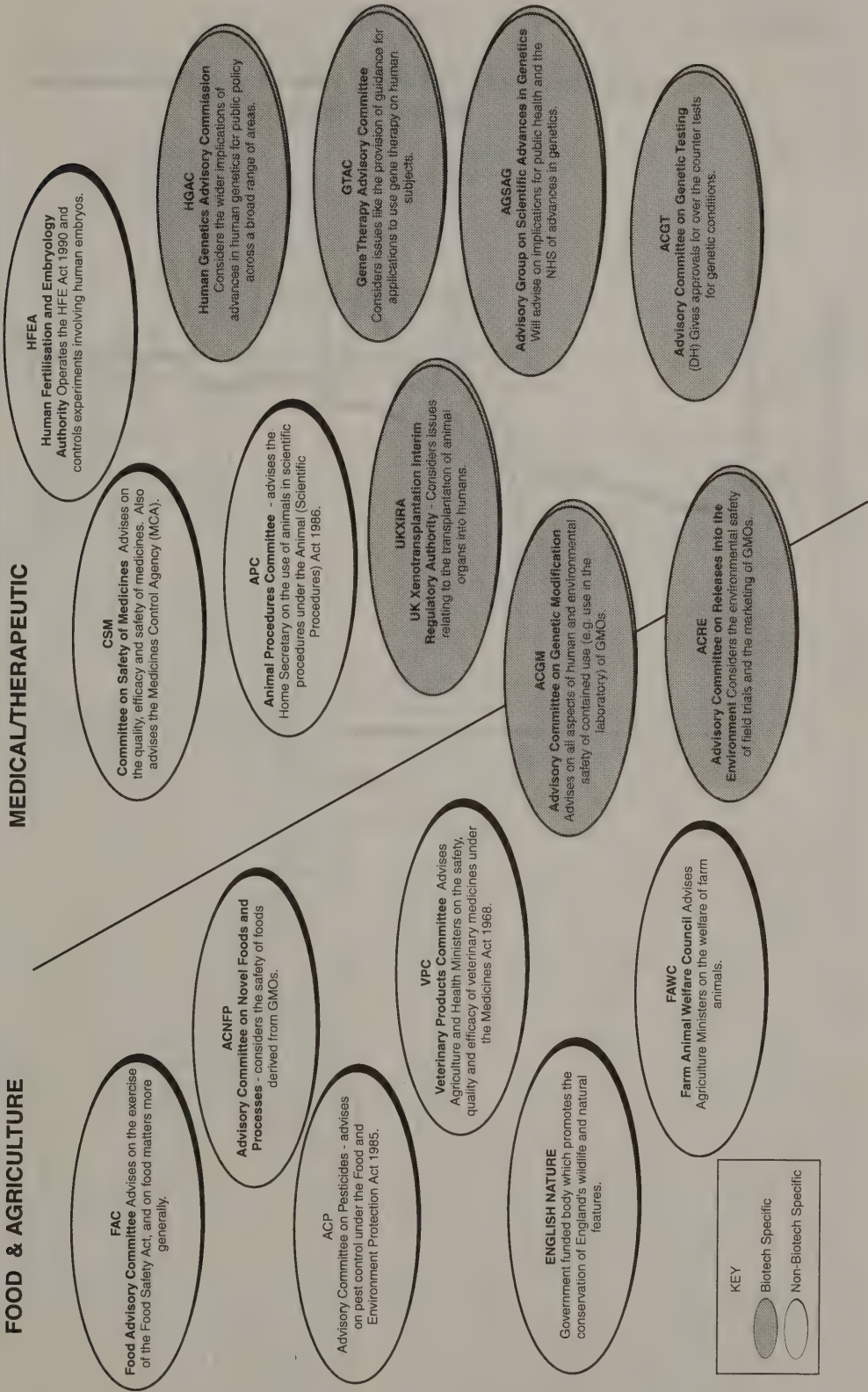
POTENTIAL ENVIRONMENTAL USES OF GENETICALLY ENGINEERED ORGANISMS

- Improve nutritional quality of food crops.
- Decrease dependence on chemical pesticides by construction of effective microbial pesticides.
- Increase plant tolerance and resistance to pathogens and pests.
- Decrease crop sensitivity to chemicals such as herbicides.
- Increase plant tolerance to environmental stresses.
- Increase crops yields by manipulating photosynthesis.
- Improve soil quality.
- Control weeds.
- Water pollution reduction.
- Clean up oil spills.
- Decomposition of organic wastes.
- Cloud seeding, snow making.
- Mining: bacterial retrieval of low-concentration metals.
- Increased energy production from organic biomass.
- Oil recovery.

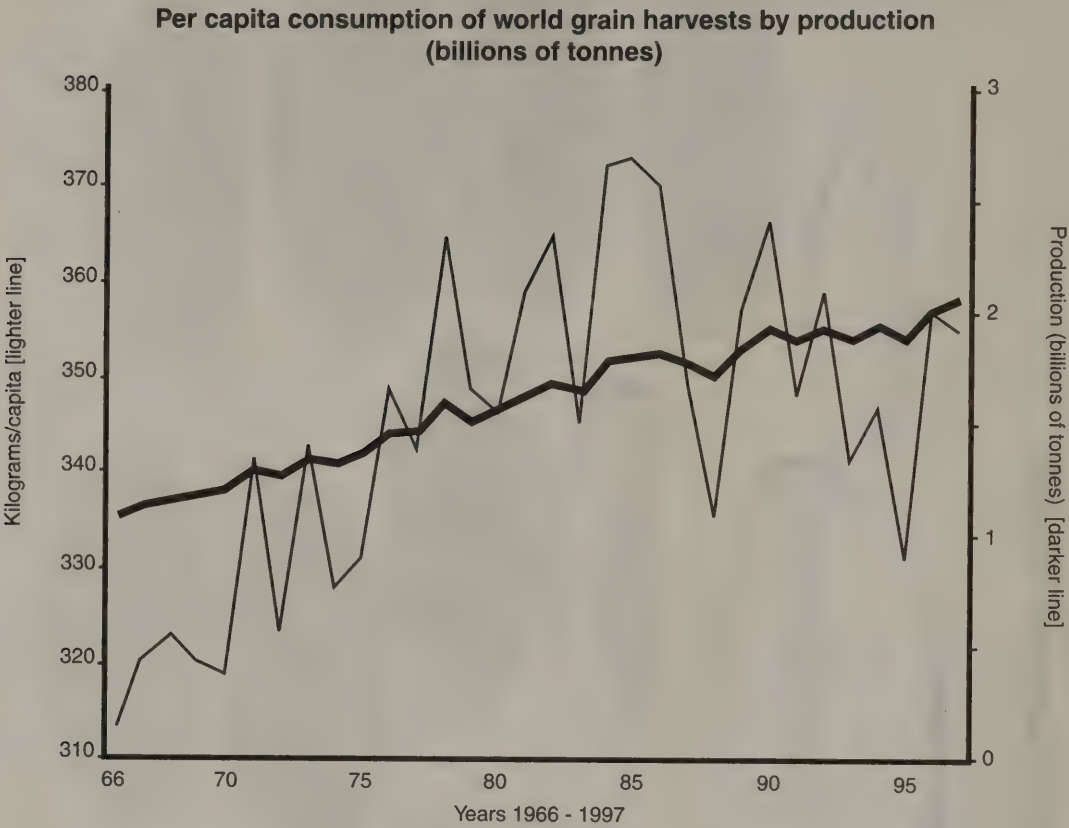
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BIOTECHNOLOGY/GENETICS ADVISORY BODIES



ANNEX 3



TUESDAY 27 APRIL 1999

Members present:

Mr John Horman, in the Chair

Mr Norman Baker
Mrs Helen Brinton
Dr Brian IddonMr Malcolm Savidge
Joan Walley

Examination of Witness

THE RT HON DR JOHN CUNNINGHAM, a Member of the House, Minister for the Cabinet Office and Chairman of the Ministerial Group on Biotechnology and Genetic Modification, examined.

Chairman

165. Good morning, Minister, and welcome to the Committee. Is there anything you would like to say by way of a brief statement before we begin cross-questioning you?

(Dr Cunningham) Yes, there is, Chairman. If I can take two or three minutes to set out the background, we all know that modern biotechnology is a very new, very fast moving area of scientific advance in a whole number of fields. It is a young technology and knowledge about it is growing all the time. That means that government has important responsibilities in relation to its development and our primary duty is and will remain to protect human health and the environment in what we do. That is the central tenet of our approach and of the Committee of which I am the chair. That is why we only act on the best scientific advice available to us when regulating the products and processes created by biotechnology to ensure that they are safe. In doing so, their impact on human/animal health and the environment is assessed by our advisers and specialist committees. A wide ranging set of regulatory bodies exists to regulate the technology. Safety is not the only issue that arises from these developments. The technology may also raise ethical questions. The government believes it is important to address those questions within the regulatory framework but of course the technology also gives rise to enormous opportunities. Biotechnology has very considerable potential for improving the quality of our lives. In terms of health care, the technology has already helped us to develop better treatments for diseases such as multiple sclerosis, heart disease and diabetes and many more are in the pipeline. Biotechnology also has important environmental applications. For example, it is helping traditional industries to clean up their processes or to reduce emissions or to deal with the recovery and rehabilitation of plants or sites. It has a significant contribution to make to agriculture. If I can quote the Royal Society in their statement of September last year, they said: "The use of genetically modified organisms has the potential to offer real benefits in agricultural practice, food quality, nutrition and health." British companies are already world leaders in the biosciences, so quite apart from the intrinsic benefits of the technology it also promises potentially

significant economic benefits for this country. We need therefore to strike a careful balance. As the Royal Society has said, the challenge to us is to capture the potential advantages whilst always protecting human health and the environment. In seeking to strike this balance, we have set ourselves a formidable task. To deliver on this, we in government need to ensure that the work of a number of government departments is coordinated. The Department of Health is responsible for health care applications and any potential impacts on public health. DETR considers the environmental implications of the new technology. MAFF is responsible for policy on GM foods and the agricultural implications of crops. DTI is responsible for promoting the competitiveness of the biotechnology sector. The Home Office is responsible for regulating the use of animals in scientific procedures. The Foreign Office has a strong interest, both in the international and environmental dimension, because our handling of GMOs could have other implications for our EU or wider international interests. The Scottish Office, Welsh Office and Northern Ireland Office also do so because implementation of aspects of the regulatory system falls to them and will in future fall to the devolved administrations. It would be wrong to think that it is possible to extract all the biotechnology aspects of the work of these departments and set up a single Ministry to deal with them under one roof. The applications of the technology and the ways in which it will impact on us are wide and varied and I do not think would lend themselves to that. Having considered all these aspects of it, the Prime Minister decided to establish a Cabinet committee to coordinate the work of government and asked me to chair it from the Cabinet Office. That is the Cabinet Committee on Biotechnology and Genetic Modification. Indeed, the responsibility of the committee is to ensure that as the technology develops government policies are properly thought through and coordinated. Let me make clear however to you and your colleagues on the Committee that I do not have responsibility for particular aspects of the policies which of course remain with the sponsoring departments and my ministerial colleagues. Soon after the committee was established, the Government announced in December last year that we wish to conduct a comprehensive review of our

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THE RT HON DR JOHN CUNNINGHAM, MP

[Continued

[Chairman Cont]

regulatory and advisory framework. We wish to ensure that the framework is as transparent as possible, meets the objectives which I have described, and I shall announce our conclusions next month, the various Purdah conventions allowing. My colleague, Jeff Rooker, has introduced new regulations requiring all foods which contain GM soya or maize ingredients to be labelled. He has also extended the requirements to restaurants and other catering establishments. This will enable consumers to exercise a choice as to whether to consume food which contains GM ingredients. Michael Meacher has announced recently details of the ecological studies of farm scale evaluations of GM herbicide tolerant crops. These will study GM and comparable non-GM crops for differences in diversity of farm and wildlife. Jeff Rooker and Michael Meacher will no doubt tell you more about these initiatives when they come before you. We have also commissioned in February of this year, from the Chief Medical Officer and the Chief Scientific Adviser, a paper on GM foods and public health. Because I feel strongly that we need to have an informed public debate on this technology and because it is perfectly right that people wish to know more about something which could have a significant impact on their lives, it is my proposal to publish that paper in due course. One thing that does concern me is that some aspects of the recent public debate have been ill informed, often fuelled by a barrage of media hysteria. I acknowledge that we all have a responsibility to stimulate an informed public debate and I have no objection to that debate or indeed to criticisms of Ministers or the government, if they are justified, but it would be far better for us all, not least the public, if the debate was conducted on the basis of an informed series of arguments, rather than some of the headlines we have seen too frequently. That is why, as I have said, I will publish this paper from the Chief Medical Officer and the Chief Scientist. At the height of media interest in GM foods and crops in mid-February, we wrote at length to all Members of Parliament to explain the government's position. As I have said, we will reinforce that approach by publishing the paper that I have mentioned. Stimulating the debate is not solely the responsibility of the government. The industry and scientists also have an important role to play, as indeed do the pressure groups and our critics, but I hope that the public debate will continue in a more informed way and on a more rational basis than we have seen recently. Perhaps I can add one further piece of information, Chairman. MISC 6, as the committee is called, has met five times since it was established and we shall be having further meetings in the next few weeks.

Chairman: Thank you. It certainly emphasises the importance of this issue and the formidable task you have as chairman of the committee in coordinating not only what happens, which is part of the story, but also the presentation and public awareness of what happens which is equally important in this very sensitive field. I am sure we all share your view that the debate should be informed and rational. We certainly hope this morning to be informed and rational about this very important topic. Can we first of all

discuss with you your role as chairman of MISC 6, the Cabinet Committee on Biotechnology and Genetic Modification?

Joan Walley

166. Thank you very much indeed, Minister, for the introduction you have given us. First of all, in respect of the Cabinet Committee on Biotechnology and Genetic Modification, what do you feel it is for? Is it to reconcile different interests? Is it to put forward strategy? Is it to get a united line or is it to somehow or another look at the different perceptions of different government departments and how they all get balanced? Could you just give us a little bit more of the detail of the kind of business and agenda items that the committee discusses, what it is actually for and how you see its role possibly changing as well?

(Dr Cunningham) The committee, as I said, is to coordinate the work of government across a very significant number of departments to ensure that, whether we are talking about human health or the health and safety of the environment or our position in the European Union or the development of the biosciences, looking at issues of biodiversity, we do have a coherent and coordinated approach across government. I suppose, to use an old phrase, so that we get our act together in these matters across the government as a whole because that is important in the number of ways that I have already outlined. That is the primary purpose of the committee. Of course, the committee will also look at issues which might arise from time to time. As you would expect, if new evidence emerges or new issues emerge, the committee would want to look at those issues, to see whether in terms of what we are doing, to have them examined by our advisory groups and that we were up to speed with the developments of what is a very rapidly moving area of science and technology. One of the first decisions we took was to set up a review of that quite complex network of advice with committees and groups that we have because we wanted to ensure that it was covering the whole field in a comprehensive way; that there were no loopholes in the system, for example. As Michael Meacher and others have been making clear, we are also looking very hard at the related regulatory system in the European Union because we would like to see some changes there. I cannot anticipate the conclusions of my colleagues in MISC 6 on the review, which we are discussing at the present time, but I would be surprised if we did not recommend some changes in that area.

167. Could you give this Committee some idea of who is on your committee? Is it mainly officers? Is it ministers?

(Dr Cunningham) It is Ministers.

168. It is totally Ministers. Do they all attend all the time?

(Dr Cunningham) I do have a list of them here somewhere which I can read into the record if you wish or hand over.

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[Continued]

Chairman

169. It is probably best if you let us have it.

(*Dr Cunningham*) Here it is. Minister of State, the Department of Environment, Transport and the Regions; Minister of State, Foreign and Commonwealth Office; Minister of State, Cabinet Office; Minister of State, Department of Health; Minister of State, Ministry of Agriculture, Fisheries and Food; Minister of State, Department of Trade and Industry; Economic Secretary to the Treasury; Parliamentary Under Secretary of State, Home Office; Parliamentary Secretary, Cabinet Office; Parliamentary Under Secretary of State, Welsh Office, Northern Ireland Office, Scottish Office; Parliamentary Under Secretary of State, Department of Trade and Industry; the Chief Scientific Adviser.

Joan Walley

170. That sounds quite comprehensive but there have been quite a lot of press statements which you mentioned yourself. I think it would be helpful if we could just clear one aspect of this up. Could you tell the Committee whether or not the Lord Sainsbury of Turville does actually sit on the committee?

(*Dr Cunningham*) Yes, he does.

171. Does he participate in discussions on the biotechnology industry?

(*Dr Cunningham*) Lord Sainsbury attends the committee except where specific matters relating to policy on genetically modified foods appear on the agenda and, if they do, he absents himself for those items.

172. In the list that you gave to the Committee, you did not mention DfID. When our Committee met last week, we heard Sir Robert May, the Government's Chief Scientific Adviser, say that in his view GM food was necessary to feed the world. We understand that there was evidence given by Jeff Rooker at MAFF to the Science and Technology Committee earlier this week and he apparently said that in his view GM food is not really necessary. I just wondered how the committee reconciles these two apparently differing views and whether or not underpinning the Cabinet Committee is the view that GM food is necessary and that we need to be at the cutting edge of this new technology.

(*Dr Cunningham*) I am of course in touch in terms of discussions and correspondence with the Secretary of State for International Development. There is an important role for Clare Short to play clearly in doing her work in developing countries. Although her department is not represented on the committee, you should not assume therefore that there is no contact or correspondence between us. In addition to the work of the committee, I clearly do have, in correspondence and in ad hoc meetings with colleagues in the government, a whole series of other activities which underpin that work. As for genetically modified food being necessary, as Sir Robert may have pointed out to the Committee, we have about 4.5 million hectares of land in cultivation in the United Kingdom, in round numbers, and about 60 million hectares of land globally producing genetically modified crops.

Genetically modified food is a reality; it is here; it is with us. The government is not here to promote particular products. We are here to see that the objects of government policy are effectively carried through, but genetically modified products are part of what is happening all around us. That is why we need to be clear and effective in our regulation and monitoring of them.

173. Would you not accept that in global terms—for example in India—there is quite a lot of concern from different communities in India that they feel very threatened by the development of the so-called terminator gene and they would want perhaps to have some input into multilateral environmental agreements which could determine the future as far as food production in their own countries was concerned and therefore DfID perhaps should have some input into this?

(*Dr Cunningham*) It certainly does have an input, as I have said, but I am pretty sure that the government of the Republic of India is perfectly capable of looking after itself. In my experience of India, it usually does so pretty effectively, but of course it is not just in countries like India that there is a debate about terminator genes. That is a debate which is going on in Europe too. All these are reasons why we do need the kind of Cabinet Committee the Prime Minister has established, to make sure we are looking both nationally and in European Union terms and, where appropriate, internationally, at these systems.

Chairman

174. You said it was a Cabinet Committee. Can I just be clear about the status of the committee which you chair, Minister, because the names which you read out are all Ministers of State or Parliamentary Secretaries. Apart from yourself, there is nobody of Cabinet rank on this committee?

(*Dr Cunningham*) That is true.

175. It is therefore more like the green committee, for example, which has a minister responsible for green or environmental matters in each department. It is not a full Cabinet Committee in the normal sense of the word?

(*Dr Cunningham*) I do not want to argue about it. We regard it as a Cabinet Committee in the way other committees are Cabinet Committees.

176. But there is a difference because sometimes, for example on Ministerial groups, which this is rather more akin to, officials can substitute for Ministers and have done on other committees.

(*Dr Cunningham*) Officials do not substitute.

177. I just wondered why it was not a full Cabinet Committee in respect of status and the handling of it inside Whitehall.

(*Dr Cunningham*) The membership of the committee has been no block to the work of the committee being taken effectively forward and, since it is the express wish of the Prime Minister that we have this committee and that Departments respond accordingly to it, I do not see any problem myself.

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[Continued]

Mr Savidge

178. I wonder if I can ask you one or two questions on how the committee actually operates? First of all, you indicated in your introduction that MISC 6 had met five times so far. On what sort of basis does it meet? Is it on a regular periodic basis or more of an as required basis?

(*Dr Cunningham*) Since the committee was formed in October last year, there have been five meetings so you can see it meets pretty frequently and, as I have said, we have other ad hoc discussions. For example, we had a presentation to the members of the committee. This work is being addressed by Ministers on a very regular basis. As I indicated in my earlier answer, we shall have two, perhaps three, more meetings in the immediate future, because we are considering the responses to the consultation and the paper from the Chief Medical Officer and the Chief Scientific Officer and other matters.

179. What are the main issues that you are looking at?

(*Dr Cunningham*) They are the ones that I have already mentioned. We have looked at consultation on the regulatory system. We have also got a consultation going on led by the Department of Trade and Industry on public understanding of the biosciences. We have looked at food and health issues in the paper from the Chief Medical Officer. We have looked at sometimes specific issues that have arisen in the course of the debate and other matters, but they are the principal issues.

180. In your introductory statement just now, you mentioned that this was one of the matters that would be devolved to the Scottish Parliament, Northern Ireland and Welsh Assemblies in due course. Have you given any thought to how things should be coordinated and whether they would be coordinated through your committee subsequent to devolution?

(*Dr Cunningham*) We shall continue with the committee after devolution but it will be for the Scottish Parliament and the Welsh Assembly and the Northern Ireland Assembly to determine how and in what way they operate. Whatever they decide, we shall certainly offer cooperation from this committee which will continue.

Dr Iddon

181. Baroness Young representing English Nature described MISC 6, the new Cabinet Committee, as "interesting but opaque", suggesting that the general public and indeed Members of this Committee were not to see the full judgments of that new committee. Could you tell us something about the way you are going to communicate with this Committee and the general public at large? Are you going to be open about the goings on in MISC 6—i.e., transparent—because if you are not how can a Committee like this judge the effectiveness of MISC 6?

(*Dr Cunningham*) I disagree with Baroness Young. I think her statement is not borne out by the record. For example, I personally met and discussed with Baroness Young the work of the committee. We

have published the position of the government in a letter to all Members of Parliament, as I said. We are going to publish the advice we receive from the Chief Medical Officer and the Chief Scientific Officer. We are going to publish our report on the consultation on the network of scrutiny and safeguards committees that advise ministers. I myself, when I was appointed to agriculture, took the step of appointing to all the advisory committees in that ministry a lay person, a non-specialist person, in the public interest and my personal record of the conduct of this committee, and in other matters, is one of always presuming that we should be as open as it is possible to be, consistent with having to go on with the orderly business of government of course. I read in the newspapers what is on the agenda of this Committee. I am not saying that I release that information incidentally, but somebody clearly does. I think the record shows our determination to be open, to seek and participate in an open, informed dialogue about what are very important and, I acknowledge, sensitive and controversial matters, but all the more important that we should have an open, constructive dialogue.

182. I am pleased to hear that. There is of course another Cabinet Committee concerned with matters affecting the environment and that is ENV. In questioning other Ministers, we have heard that it does not often meet; a lot of the work is done by passing paper between Ministers and the Cabinet Committee itself. Why was it felt right to set up MISC 6 when in fact much of the work of MISC 6 could have been done by ENV? What is the relationship between these two so-called Cabinet Committees?

(*Dr Cunningham*) MISC 6 was set up to be specifically responsible for issues relating to biotechnology and in particular those arising from genetic modification. It has a very specific remit in that regard. ENV has a much wider role, looking at what is happening in government departments across government in terms of the environmental policies. It is a very different committee. When you say what is the relationship, of course many government departments see the papers for MISC 6. If there was ever thought to be a need for us to refer a matter to another committee—one thinks of (E)DOP, for example, the committee on European policy—as well, then we would do so. In the end, the coordination and presentation of our case in Europe is done by the Foreign Secretary as chair of (E)DOP, of which I am also a member, so we do try to ensure that where it is necessary and appropriate proper, effective communication occurs between the members of the different committees. I do not see a problem there personally.

183. ENV meets quite infrequently and deals mainly by passing paper. We have been rather critical of that. When we put this to Michael Meacher, for example, he said that the fact that it does not meet very often suggests a degree of consensus about Government policy around the different Ministerial Departments. We have just heard this morning that your committee so far, set up in October, has met five times and is going to meet three or four times in the immediate future. Do we take it therefore that there is

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a degree of non-consensus about policy between different departments, quite the reverse?

(*Dr Cunningham*) No. We just thought, having had the decision of the Prime Minister to set up this committee, we should begin work quickly and press on with addressing these issues and we have done so. There is nothing untoward or unusual about committees trying to clear business by circulating papers. That is a normal part of the process of government. I am on I think 16 different Cabinet committees and I chair three. I am not on all the Cabinet committees, so you can see that there is a tremendous workload here for ministers at all levels, Parliamentary Secretaries, Ministers of State and Cabinet Members. If papers can be cleared by correspondence, it is to the benefit of better government. It expedites the business of government, so there is nothing untoward about that at all. Indeed, at the present time, in respect of another committee which I chair, I am trying to get agreement to a major policy paper by correspondence because we simply at the moment cannot find the time to get all the ministers together in the timescale necessary. That is a perfectly normal part of the process of government.

Mrs Brinton

184. I would like to turn the discussion to public concern, justifiable or not justifiable. Minister, if I can take you back to your opening remarks, you referred to an ill informed barrage of media hysteria and generally, although you did not use the term, unhelpful headlines. I am sure you are probably referring to the barrage of coverage such as "Frankenstein food" and I am sure that you would not agree with the interpretation that perhaps oranges are going to start sprouting fish fingers, but is it not fair to say that perhaps the United Kingdom media might be acting as a very sensible watchdog here? If you say that the concerns that they are raising are untrue, what do you think are the justifiable public concerns with GM food? What are the risks? We have heard about the benefits; what are the risks?

(*Dr Cunningham*) I am not objecting to anyone in the media, whether it is the newspapers or anyone else, acting in the public interest. I have not ever and would never object to that. That is a perfectly proper, and indeed necessary, role for the media to play. It is part of their *raison d'être*. I do, as you rightly say, sometimes just blink a little when I see some of the headlines of the kind that you describe. We saw some again just in the last few days when there was a suggestion that GM crops could lead to the creation of meningitis, for example. There is not a shred of proof of evidence that could lead any reasonable person to that kind of conclusion. As the scientist referred to in some of the articles said: "I am satisfied that the Advisory Committee on Novel Foods and Processes has taken the right approach in the way it offers advice on the use of antibiotic resistant marker genes." He is quite satisfied that the system is working effectively. If there are real problems in these areas of policy, let us address them but I think some of the media attention for this has been alarmist; it has not been substantiated by any coherent body of evidence and I do not think

it has helped the debate. I do not think it has helped the public either but in the end I do accept there are public concerns and it is for those, among other reasons, that we have set up this committee. It was to give the public a clear choice as to whether they wanted to purchase products with genetically modified ingredients in or not that this government brought forward the policy on labelling which I might say the previous government had opposed. We are working to give people proper information and choice in this matter. That is what they are entitled to and that is what the Government will ensure.

185. I was certainly encouraged when you mentioned that Mr Rooker was now insisting on the labelling so that people would have the choice but I still have to say that, from my own point of view, if I went into a supermarket or if I went into a restaurant and I was offered a list or choice of GM menu or not, I do not think I would think twice about it. I just would not pick the GM options and I do feel that is what the majority of people in this country will also feel at this time. I would like to take you on to your comment about the government's deliberations being based on the best quality of scientific advice. Last week at one of our hearings the government's Chief Scientific Adviser, Sir Robert May, addressed us and, despite repeated pressing, he could offer us no certainty in terms of what the long term outcome would be health-wise with relation to GM foods. He said that he was talking about shades of grey. I do not think that we can have the type of rational, informed debate from which the government can take decisions until we have certainty and I would say that I think the public is not satisfied about the quality of scientific advice. Perhaps they are even making a link with the quality of advice over BSE. That is what concerns me.

(*Dr Cunningham*) The only thing I see in black and white is Newcastle United Football Club and even they sometimes play in blue. There is no point in asking for certainty. We do not live in a world of absolutes; we do not live in a world of certainties; we do not live in a world which is risk free, so I think you are asking the impossible in asking for certainty in these matters. We simply cannot provide certainty. We can only act, as I have said, on the best available independent advice, advice which is usually coming from several different sources at once, several different committees. There are checks and balances in the system. When we had the consultation about how that advice is formulated for us and whether it is being done as effectively as it might be, we deliberately asked anyone anywhere in the country, any organisation or individual, to give us their views on how we might improve the way the system operates, again, being perfectly open and giving everyone the chance to contribute to this review which we have done. We are now assessing those contributions and my belief is that we shall almost certainly make some changes to the way the system operates, but we can never give you what you demand if what you demand is absolute certainty. It just does not exist in these matters.

186. We have established that, rightly or wrongly, there is a large amount of public concern. Some of it

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is scientifically supported and you will probably say that some of it is not. We also know that we have sufficient, even a surplus, of agricultural productivity so what really is driving and propelling the need to entertain even a smidgen, even the smallest risk, with public health or the environment given those facts: public concern on the one hand and agricultural surplus on the other? Why do we even need to dance on the tightrope?

(*Dr Cunningham*) You pose that question as though there was no risk to people from non-genetically modified foods which of course is simply not true. You pose that question as though there may not be a risk from any novel food, even though it might not be a genetically modified food. The fact is that risks exist with food, with novel foods and potentially, as you say rightly, with genetically modified food. We have to quantify them all. There is nothing special about genetically modified food in that regard. In your earlier remarks, you made a reference to BSE. Let us be clear: BSE was a disease. BSE involved infectivity. There is no infectivity in genetically modified products. It is just not the same thing. Although I recognise that we do need to learn some very important lessons from what happened with BSE, there is no infectivity in genetically modified food so to say it is the same as BSE is I think not supported.

187. I do not think I was saying that it was the same.

(*Dr Cunningham*) I know you did not say that.

188. Perhaps the public might make the link. It is useful that you have now mentioned this and put on the record that there is not that infectivity.

(*Dr Cunningham*) If I may agree with you, the public are right to make the link about the way matters of this kind are handled by Government. That is an important lesson to learn, but to compare BSE with genetically modified food in substance I do not think is sustainable at all.

189. We were fortunate to see English Nature earlier on at the beginning of these deliberations and they did suggest to us really quite forcefully that the current combination of concern at food safety and environmental concern was not helpful in lumping them together and that, as far as the public's concern, environmental matters could be quite easily dealt with. Government would be able to reassure the public easily compared with concerns about food safety in the public mind. Would you agree that it is going to be easier to reassure the public environmentally on this matter rather than with food safety? If you do agree with that, what are the fundamental questions the Government should be seen to be asking? What could the government do in the most positive way to allay public concern about food safety?

(*Dr Cunningham*) The government came to office committed to establishing the Food Standards Agency exactly because we thought it was important to respond to the understandable public concerns about food and health. I think not only of BSE in that regard but of E coli and salmonella and other food-borne problems. We are pressing ahead with the creation of

the Food Standards Agency which will for the first time separate responsibility for the promotion and development of food production from these food safety issues. The government remains of the view that that is the right way forward. The responsibility for food safety will be removed from the Ministry of Agriculture, where it has been for all of this century, and placed in the hands of an executive agency, namely the Food Standards Agency. We think in the long term that is the way to begin to restore public confidence on those issues. Baroness Young is right to say, when you look at an entirely different set of issues, when we look at genetically modified crops and the environment, because there we are looking at environmental safety and issues of biodiversity, we are looking at issues of potential cross-pollination and in various ways the government is addressing those matters too. It is for those reasons that we have very carefully gone ahead with trialling, which is why we want to go to further experimental growth of potential commercial products, none of which incidentally have been licensed since 1997 and about which we are still talking to the industry now.

Mr Baker

190. Do you think that the Government has handled this whole issue successfully since it came to power?

(*Dr Cunningham*) I think the Government is doing the right things in the way we are approaching the matter. As for "successfully", if you look at food safety issues, I think we were right to publish the White Paper on the Food Standards Agency. I think we were right to set up the inquiry into BSE. I think we were right to introduce labelling of foods with genetically modified material in them. I think we were right to establish an advisory committee, which we are in the process of doing, on animal feedstuffs. I think we were right to set up MISC 6. I think the government has done a number of things which were right and appropriate in the circumstances. It is for others to judge over time whether the Government's policies have been successful or not.

191. I could list policies which I could put to you were not right but rather than do that can we concentrate on the presentational side which is I believe part of your remit and your coordinating role, the role you have been given by the Prime Minister. Do you have any regrets about the presentational way in which the government has handled this issue?

(*Dr Cunningham*) No.

192. Can you explain why the Agriculture Minister over the weekend is reputed to have said in a leaked document that he did have regrets about it?

(*Dr Cunningham*) I think you had perhaps better direct that question to sources in the American administration from which the leak came. It is not my understanding of what he said. Let me put it that way. I have a note from the Ministry of Agriculture of the meeting.

193. That is very interesting. Back in February when you mentioned that this matter was at its height,

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a phrase you used earlier on, you said the media was ill informed; there was a barrage of media hysteria and they were alarmist. By "alarmist", perhaps you meant they sounded the alarm rather than anything else. Is it not the case that, had the Government presentation been more organised and Government policy more coordinated at an earlier stage, there would not have been the opportunity for the media to come out with these headlines?

(Dr Cunningham) No, of course not. How can that be right when all that media comment flowed from a press conference organised here in the House of Commons by environmental organisations associating statements with the work of Dr Pusztai? The Government was not in charge of that. We did not know about it until afterwards. We were not given prior warning of it any more than we are given prior warning of some of the media stories to which I have referred. In those circumstances, the government is always going to be responding, is it not, so the premise of your question is false.

194. The premise of the question is based on this: that the government had not coordinated its policies and got across to the public at large where the government was going on this issue in general. The consequence was there was a vacuum which Dr Pusztai's report filled and the government was then put on the back foot.

(Dr Cunningham) That is also wrong, is it not? It is not even logical. We have scientists involved in research programmes the length and breadth of the country. The Government is not intimately involved in all the results, valid or perhaps not valid, which may flow from these things. The normal course of events for scientific work is that it is subject to peer group review before it is published. This work was not subject to peer group review before it was published and I think that probably the whole process was intended to produce the kind of result which it did.

195. I was not referring to the accuracy or validity of the report in question, Dr Cunningham. I was referring to the fact that there was a vacuum and the Government was put on the back foot by that occurrence. Do you for example endorse the way the Prime Minister approached the matter when he said basically that GM food was the best thing since sliced bread?

(Dr Cunningham) There was no vacuum. If I can get this historically in context, MISC 6 was established last autumn. The decision on the Advisory Committee on Animal Feedstuffs was taken last year. The requisitioning of the paper from the Chief Medical Officer and the Chief Scientific Adviser predated the press conference relating to Dr Pusztai and his work. Your suggestion that there was a vacuum is completely not borne out by events.

196. The Committee has heard your answer but at the beginning of that particular week the Prime Minister very forcefully endorsed GM food and GM technology. You yourself followed him and it was very obvious that the Government strategy at the beginning of that week was to put yourself and the Prime Minister up and, later on in the week when the public

became very alarmed, if I may say so, you were wheeled off stage and Michael Meacher and Jeff Rooker were brought on to reassure the public. Is that not what happened that week?

(Dr Cunningham) As recently as this morning I was doing yet another interview on this subject. If I have been wheeled off stage, all I can say it is news to me and probably news to Mr Noughtie too who interviewed me at 7.30 this morning.

197. Can I refer you to a question and answer which took place in this Committee last year when Jeff Rooker was before the Committee? I asked him, "What is your Department's strategic view of the place for genetic engineering and agriculture, say, in five years' time?" Mr Rooker said in reply, "I am not sure we are in the driving seat". Is the government any more in the driving seat now?

(Dr Cunningham) What Jeff Rooker was referring to is this: I said in my opening remarks, and let me repeat it, that this is a very fast moving area of science with very rapid developments. The science is being driven forward not just in universities, colleges and research institutes in the United Kingdom but around the world. There are many, many developments in the pipeline. That is what he was referring to. No Government, not even the Government of the United States of America, can be in the driving seat in terms of controlling the rapid development of science and technology. What we must try to ensure—and this is what I have been at pains to point out to the Committee on more than one occasion this morning—is we have appropriate and effective systems in place so that we can safeguard the public and the environment whilst allowing the advance of these sciences and their development. That is the role for the government. The government is not in charge of those developments; we learn of them, like other people learn of them, often when they are published in scientific journals.

198. "Appropriate systems in place"? You said earlier on the central tenet of government policy was to protect health, the environment and animal health. I think that is what you said, Dr Cunningham, at the beginning of your statement. Do you believe, in that case, that the precautionary principle has been applied throughout by Government Ministers on this issue?

(Dr Cunningham) Yes, I do. In general terms, we do take that view. That is why, for example, ministers, and our advisers for that matter, like the Advisory Committee on Novel Foods and Processes, have been very cautious about some of the products that have come forward. Indeed, that is why on more than one occasion the United Kingdom has opposed the licensing of some products in the European Union.

199. Can you explain, in that case, why there is only one government inspector, according to HSE figures, to examine the trial sites under cultivation at the present time? Can you also explain why isolation distances from GM crops are being applied of 200 metres when I have a parliamentary answer here from 6 March 1996 in which Tam Dalyell, your colleague, asked at that point about isolation distances and the Tory Minister at that point said, "The findings contained in the Scottish Office report suggest that for

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this particular four year project, isolation distances on GM crops, viable pollen will disperse to distances of up to 1.5km from source". Would you say that the isolation distances applied now, which are considerably less than suggested in that official parliamentary answer in 1996, would endorse the statement that you made that precautionary principles were being applied?

(Dr Cunningham) I am not responsible for answers or policies from the previous administration. I do not want to get into them now but what I can say—and no doubt you will have the chance to explore this in more detail with my colleagues when they come before you, if they do—is that the government is supporting the research programme into matters of cross-pollination and separation distances. We are looking at all those things in some considerable detail, let me emphasise, on the basis of trials. We are not in the situation yet of having full farm scale trials, let alone commercial growing of any of these crops.

200. The Committee will have heard your statement that you believe the precautionary principle is being applied. Going back to the handling of the issue and the presentational aspects, what lessons would you say the government has learned from the catastrophic way in which the BSE situation was handled in presentational terms? I am not accusing your government of that but what lessons have been learned?

(Dr Cunningham) The inquiry which is going on into BSE will no doubt come forward with some recommendations when it has concluded its work. I think we should await the outcome of the inquiry but in general one of the lessons is that we should be more open. We should be more precautionary. We should perhaps have acted more quickly and we should have taken Parliament and the people more into our confidence than the then government did. Those are pretty obvious, broad lessons but in general I think we should wait for the result of the inquiry. We set up the inquiry exactly so we might learn the appropriate lessons from what has been an absolute catastrophe for our farmers and for the rural economy and of course not least for the families of people who have lost people as a result of new variant CJD.

201. In terms of the Government's performance to date on this issue since you took office, you admit no mistakes in your presentation. You think it has been fine. The coordination has been fine?

(Dr Cunningham) Are you talking about BSE now?

202. No. I am coming back to the presentational aspects of GM technology since you took office. Do you have any regrets about either the presentational aspects of the Government's policy or the policy itself?

(Dr Cunningham) I did not say that we had not made any mistakes. I do not recall being asked the question whether we had made any mistakes. We can always learn lessons from experience and we do. One of the reasons we have so much independent advice is because we acknowledge straight away that we do not know all the answers. Any Minister who comes before this or any other committee and pretends to know all

the answers to these questions is not only misleading the Committee but deluding themselves. I am not saying that we could not do things better in retrospect but hindsight is always 20/20 vision, is it not?

203. What mistakes have you made?

(Dr Cunningham) I am not going to give you a list of things which you might say we could have done better. Why not tell me what mistakes you think we have made.

Chairman

204. Following on from that, one of the points which Baroness Young has made to the Committee, quoting from an article she wrote covering the same area, is that more research on the impact of GM crops on wildlife has recently been commissioned by the government's Environment and Agriculture Departments but they will not report until the year 2003. Yet, in spite of these scientific concerns, we saw the Advisory Committee on Releases into the Environment recommend approval of the commercial release of herbicide tolerant oil seed rape. The problem there is that someone who is obviously not in the business of writing sensational headlines, Baroness Young, is a very responsible, independent minded person looking at things seriously and serious members of the public, who want to understand this, will look carefully at what she says. She is pointing out the apparent contradiction in what on the one hand the government is doing as opposed to the other. How do you deal with that?

(Dr Cunningham) I accept what you say. Baroness Young is a distinguished public servant for whom I personally have a very high regard. She was one of my advisers when I was at the Ministry of Agriculture. I have no quarrel with Baroness Young or what she says. Of course it is the case that we do need to know more. That is exactly the argument for having field scale and farm scale trials with crops before we move to full scale commercial plantings. If we are to have a better assessment of the impact on the environment, on biodiversity, then we have to be able to study it. If we just brought everything to a halt, we would not learn anything.

205. She is saying it has not happened in this case.

(Dr Cunningham) I think what she is saying is she is acknowledging that we have set in train more research, as you said. What she would like to see, if I understand her position correctly, is a little more time before any contemplation of commercial growing of crops was authorised. That is the difference between us. Although she was widely misquoted at the time, or English Nature was, Baroness Young and English Nature were calling for a moratorium on herbicide tolerant crops only, not on the whole range of—

206. That is what we are talking about here.

(Dr Cunningham) That is right. As I said earlier in response to Brian Iddon, I have discussed this at some length, as have my ministerial colleagues, with Baroness Young and we understand her position. It is partially as a consequence of that that we are looking to see whether we can meet them on the kind of

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research they would like to see done. In addition, I am sure he will tell you more about it when he comes but Jeff Rooker has been in the lead on discussions with the industry on the so-called SCIMAC voluntary code of practice on these matters. I am not involved in the day to day details of those discussions. It is not my responsibility, but we are trying to meet various competing arguments here. As the Prime Minister said and as I said—Mr Baker was reminding us—the Government does not believe that a complete moratorium is either justified or necessary for these matters.

207. Reading Baroness Young's remarks, ordinary members of the public will think the Government is putting the cart before the horse. It is allowing the commercial release of herbicide tolerant oil seed rape, for example, while research which cannot come to a conclusion before the year 2003 is going on. This seems to ordinary members of the public who are not scientists to be putting the cart before the horse. How do you deal with that?

(Dr Cunningham) I want to respond to that in two ways. One is it is not ACRE who agree the final licensing. It is the Secretary of State at the DETR, the Deputy Prime Minister, who has the final say whether commercial exploitation can be allowed. ACRE give their advice. They express an opinion but it is for the Secretary of State to decide. No such agreement has been given. We have not, as I said some time ago in this hearing, since 1997 authorised the sale of one new genetically modified food in this country or one licence for the commercial exploitation of genetically modified crops. Neither has happened. We are looking at the situation with considerable caution and great care before any such steps might be taken. We are in consultation with English Nature and others about it.

208. Given that research does take its time and obviously that is a practical matter—it is three or four years before research can reach these conclusions—can you understand the public concern that things might get out commercially before that period is up and therefore the demand for a moratorium, or whatever you like to call it, a slowing down for three years before research can reach a conclusion, seems sensible; and yet the Government—Mr Meacher in particular—has refused to concede that?

(Dr Cunningham) Chairman, there has been a slowing down since 1 May 1997. There has been a great slowing down, believe me. We are not here to do any favours to the industry in these matters at all. We need to be satisfied that it is appropriate for these advances to be made and we are doing the research that you referred to because we recognise that it is important that we should do so.

209. The logic of that is that you do not do any commercial licensing, and it is your responsibility and the responsibility of the Secretary of State for Agriculture, before the research is completed, ie not before three years, hence the call for a three-year moratorium or something of that kind. The Government refuses to agree to this and therefore there is public concern. Do you see the point?

(Dr Cunningham) Yes I do. I always try to see the point about public concern. I had the feeling myself

that there is more public concern about genetically modified food than there is about environmental issues but that is certainly a subjective view. Nonetheless, we are concerned about the issues of biodiversity. We take advice not only from our own organisations. It is perhaps worth placing on the record for the Committee that genetically modified crops have been grown for almost 19 years in North America with almost no discernable effects on biodiversity. Some people would say that is because the circumstances are entirely different. I accept that they are different but even allowing for that just recently I was listening to and reading a paper submitted by a Canadian Government adviser on these matters who was saying that they have not been able to detect any significant problems so far. We are not just looking at the experience we see here.

210. Sure.

(Dr Cunningham) Which, incidentally, we judge on a year-by-year basis. If in the course of this research some matter for concern arose then of course we would have to think again about how we should proceed.

211. That is true but nonetheless it does seem from this sort of example that what you need now to properly combat all the scare stories like the *Daily Mail* headline on meningitis on Monday is a media strategy or a clear view of what the Government is doing put across in such a way that people are reassured. They are not reassured at the moment hence this spate of stories and the public apprehension and it does not seem that the Government has got a strategy.

(Dr Cunningham) A strategy for?

212. A media strategy for the sort of things that Baroness Young is saying.

(Dr Cunningham) Yes, well, we do indeed have a media strategy, Mr Chairman. Perhaps this will bring a smile to Mr Baker's face when I say like all media strategies it is not guaranteed to work 100 per cent. Part of the reasons for that, as we know, are that some people do not want to hear what we are saying. But of course we try to have a media strategy, a positive one as well as a responsive one and we try to give the public in a consistent way the best possible advice which is available to us and we shall go on doing so. To come back to this question, we have tried to establish a research programme going from trials to field-scale trials to farm-scale trials exactly because we wanted to assess the impact. The argument really, the difference between us is about how much longer we need to do that work before a licence might be—and I say might be because I keep reminding you that no licences have been approved¹—approved and we look at that on an annual basis and we are in discussions with the industry about these matters as well as with English Nature.

213. I do think you need to look at an information strategy, media strategy, whatever you like to call it, to reassure people that these things are being taken in a logical sequence. There clearly is not public confidence in that at the moment.

¹ Note by Witness: No GM crops currently have all the necessary authorisations for general cultivation in the UK.

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(Dr Cunningham) I am not sure whether that is true or not. What we do know is that public concern ebbs and flows often with the waves of media coverage of these matters. We are having a public consultation on the public's attitude to biosciences in general exactly because we want to get a better understanding of what does concern the public, why they are concerned and what we might do about it. I expect we shall be publishing the analysis of that public consultation round about the time we publish the conclusions of our review on the various committees and safeguards and advisory groups that we have. I suspect, rather like some of the responses from the people's panel consultations, it will not all make comfortable reading for Ministers but we shall publish it nevertheless.

Joan Walley

214. I would like to come back to a few points which have come up which are of interest during the course of what has just been said. I will resist the temptation to talk about the certainty of Newcastle United winning the championship—

(Dr Cunningham) I do not think they are going to win the Championship, at least not this season, but they may have an outside chance of winning the FA cup.

215. In terms of the precautionary approach and in terms of the work that the MISC 6 does, where does the precautionary approach stand when the balance of its work and strategy is actually considered? Is it one of the pillars of what it is resting on? What weight do you put on it?

(Dr Cunningham) Yes indeed, and it is exactly because of that that in the case for example that I referred to earlier of the Advisory Committee on Novel Foods and Processes looking at products because people were concerned about issues like antibiotic resistance that we decided that this particular product should not have our support for approval. That is based on what was described by Professor Bainbridge, the Chair of the Advisory Committee, and by Dr Heritage as a very, very low probability but nevertheless they decided on the precautionary principle that support should not be given. It informs not only our work as Ministers but the work of the individual groups of people who are there to give us their considered opinion.

216. In terms of what has just been said about the comment for example on meningitis, you would say that the precautionary principle was behind John Heritage's statement that he made earlier on in terms of meningitis?

(Dr Cunningham) Janet Bainbridge said: "Whilst recognising that resistance to antibiotics used to treat a number of diseases including meningitis is already widespread, the ACNFP takes great care to ensure that the use of antibiotic resistant genes in GM crops does not add to the problem." That is why they did not give the product support but she went on to say, "There is, however, no suggestion whatsoever that genetically modified crops could lead to the creation of meningitis or any other diseases, as reported in certain parts of the press."

217. It is what was behind John Heritage's remarks that was of interest to me. Can you confirm that it is the case that some pre-1987 trials that were granted actually still stand?

(Dr Cunningham) I am sorry, Joan, I did not get that. Say it again.

218. Could you just confirm that the commercial trials that were granted and given permission for before 1994 still stand?

(Dr Cunningham) I am not sure.

219. Have we got a full and complete list of all the permissions that have been given where some might have gone by default?

(Dr Cunningham) There must be such a list and perhaps I can write to you about that.

220. In terms of the trials I know it has been the case that the 1999 pilot trials will be destroyed but what will happen to the products from the farm-scale evaluations in the year 2000?

(Dr Cunningham) I think that is yet to be determined.

221. So there could be an outside chance that some of those could constitute a commercial release, albeit on a limited scale?

(Dr Cunningham) I think you should explore that. It is my understanding that it has not been determined but I think you should explore that with the Ministry of Agriculture.

222. In relation to labelling, because you did mention that, can I just confirm whether or not it is the case that the Government has actually introduced fines and what progress has been made on fines for failure to label food, and food in restaurants? I understand it is only through fines that those regulations can actually be enforced. What progress has been made on that?

(Dr Cunningham) The regulations are relatively new, of course, and I do not know how the monitoring of the regulations has gone in the time since the regulations came into effect, but of course the matter of enforcement of the regulations is a matter for local authorities, as I am sure you know, not a matter for Ministers or Governments. I think we could probably get a note to you about that but I am not aware that any action has been taken against anybody to date. I am not saying it has not, I am just saying I am not aware of it.

223. In respect of the precautionary approach, if the input of the DTI into the committee is from the perspective of not just competitiveness but from consumer safety how do you see the issue in respect of labelling and the particular problem that we have got with the World Trade Organisation where, as I understand it, they are not prepared to allow any separate labelling that would actually give individual people the choice of whether or not to purchase or not to purchase GM foods.

(Dr Cunningham) Food safety issues are not a matter for the DTI, they are a matter at the moment for the Ministry for Agriculture but will pass to the Food Standards Agency. As for the WTO position on labelling, labelling is a matter for us. We have a certain amount of discretion although they are European Union requirements too. I have maybe misunderstood the

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[Continued]

[Joan Walley Cont]

problem but I am not sure we have any problem at all with the World Trade Organisation in respect of the labelling of food products.

224. I think it is the issue of the American crops.

(Dr Cunningham) You are talking about the labelling of animal feed here?

225. No, not of animal feed, of food and concerns from some quarters within the United Kingdom and within the European Union that food coming in from America that contains soya which is GM modified should actually be labelled as such and the position of the WTO not to allow that segregation so there is no distinction between non-GM soya and GM soya.

(Dr Cunningham) I am getting a *billet doux* here. The note is telling me, Joan, what I have already said to you. All foods which contain GM soya and maize ingredients must be labelled under the EU regulations and under our own introduction of those regulations. They have to be labelled.

Chairman

226. One of the concerns that has come out recently in the public and press is buffer zones between GM fields and ordinary crops. Yesterday it was said by Michael Meacher before the Science and Technology Committee that what had guided departments in establishing such zones was traditional agricultural practice. He had to concede in the case of a bee, for example, they go higher than five or six miles which is far greater than an ordinary buffer zone as proposed. Is this the sort of thing you would discuss in your Committee?

(Dr Cunningham) Yes we would although, generally speaking, that would be a matter which would be dealt with in the DETR and with the advisory groups like ACRE for example. If we definitely thought that was a major problem then the normal procedure would be followed and I would invite Michael Meacher, as the appropriate Minister, to bring a paper to the Committee.

227. You have not done that so far?

(Dr Cunningham) Not so far.

228. This is an example of where the absence of what I would call an information strategy does puzzle people because on the one hand the Government is insisting on traditional practices in buffer zones, which is understandable and equally the Minister for Environment is saying that these are not enough and the public remains confused about what is enough. If you had gone into this beforehand and established a clear line then possibly the public might be more reassured. I am trying to be helpful here to establish how you can get a policy that is based on fact and practice but can also at the same time reassure the public.

(Dr Cunningham) Of course, we inherited certain positions which we have been looking at. This did not all begin after 1 May 1997 when we had to deal with circumstances as we found them and take advice and decide whether we should change policy or not. In a number of areas we have changed policy. What we would want to do would be to base how we approach field-based trials or farm-based trials on what we feel is accepted as the best practice in the circumstances. It is

for these and other reasons that the Ministry of Agriculture, for example, has been funding some research into things like cross-pollination to see what, if any, changes should be made and whether changes are necessary. As I said earlier, there is not a lot of evidence that this is a huge problem but, as you rightly said yourself Chairman, bees do not have no-fly zones.

229. Exactly, that is the point made yesterday. In the light of what was said yesterday and obvious concern by the public about what seemed to them to be a very elementary point, will you be looking at this in your Committee?

(Dr Cunningham) We are looking at it.

230. Currently?

(Dr Cunningham) Yes.

Mr Baker

231. Will you be taking into account the Parliamentary question I referred to earlier on which referred to isolation distances of 1.5 kilometres from source?

(Dr Cunningham) We shall be taking all appropriate evidence and arguments into account.

232. You said earlier on, Dr Cunningham, "I do not have a responsibility for policy aspects" in referring to your role in the committee. Here we have a clear policy matter which is the isolation distances or buffer zones around crops. What I am not clear about in my own mind is whether your role is to bring people together and let them slug it out in private in this particular committee or whether you are knocking heads together and to what extent you are a neutral chairman or you bring to bear your knowledge from your previous existence as Minister for Agriculture and elsewhere. It is difficult to argue that you have no policy role in that although you may not have responsibility.

(Dr Cunningham) Whether I am the enforcer or the facilitator maybe?

Mr Baker: Exactly.

Chairman

233. Maybe there is no difference between the two.

(Dr Cunningham) I think that is probably right. The former is much exaggerated and the latter is much more the norm in my role. But my role is obviously to ensure that all the important policy issues are addressed. What I meant when I said I do not have policy responsibility is I do not have day-to-day responsibility for what is going on in the Ministry of Agriculture or in the DETR or in the Ministry of Health. It would be absurd to suppose that someone in my role in the Cabinet Office was interfering left, right and centre in the day-to-day work of different Ministers. That is what I meant. I am sorry if that was misleading. Of course I have responsibility for the overall co-ordination of policy across Government and I am responsible to the Prime Minister for ensuring that that is done as effectively as we can do it.

Mr Baker

234. Do you have authority from the Prime Minister to say for example to your hypothetical colleague, "The position you are taking is unhelpful to British industry.

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[Continued]

[Mr Baker Cont]

You must look at it again and back off", or say to another colleague, "The position you are taking is inconsistent with this department. You must review that"? That is your role, is it?

(Dr Cunningham) Of course I have the authority to say, "Here is an issue which I think you should give attention to", but I would not do that in any partisan way at all.

235. You cannot overrule Ministers in departments in any way?

(Dr Cunningham) No. I can ask them to think again.

Dr Iddon

236. Can we look at the future developments of biotechnology and the speed at which things are going to which you have already referred. What are the aims of United Kingdom policy with regard to this development and have we set any priorities for ourselves?

(Dr Cunningham) Perhaps I can by way of background give a brief description of where we are in the United Kingdom, Brian. We are one of the world leaders, second only to the United States of America in the development of the biosciences. We forecast that the world market for biotechnology products will probably reach about £70 billion by the beginning of the new millennium. The biotechnology dependent sales by United Kingdom industry is forecast to reach some £9 or £10 billion. Sectors for which biotechnology holds most promise account for almost a quarter of the United Kingdom's total industrial output, employment and exports including pharmaceuticals, agriculture and food. We have got more than 250 biotechnology SMEs already in the UK, as I said it is a rapidly developing sector, employing several thousand people. If you take the pharmaceutical chemicals, diagnostics and agri-food industries together they employ directly and indirectly about 1.75 million people and that is about some six per cent. of the working population in the United Kingdom and they account for something like seven per cent. of the United Kingdom GDP so there are formidable interests here for us and what the Government wants to ensure, insofar as we can, is that we do not unnecessarily hinder or block the development of these technologies, scientifically, medically or industrially because we can see that they bring potentially very significant benefits to our economic and social well-being. So we want to allow them to flourish, consistent with what I said right at the outset in my opening statement, ensuring that we safeguard the health and well-being of people and the environment.

237. Has the review of the framework for overseeing developments in biotechnology been carried out in the context, or the expectation, of a strategy for the development and application of the technology or is the review aimed at fulfilling the requirements of EU legislation or both?

(Dr Cunningham) The review that we are conducting in the Committee?

238. Yes.

(Dr Cunningham) The review is confined to looking at whether we have the appropriate and

effective regulatory framework in practice. I set out the aims of the review in the Parliamentary Answer on 18 December, a document I am sure the Committee adviser has already provided you with, so the review is restricted to those matters. Matters of industrial strategy and sectoral strategy of course remain with the Department of Trade and Industry.

239. You have spent a lot of time, Minister, this morning discussing public concern—and there is a lot of public concern, that is obvious—but as you tried to point out in your introduction there are some good things about biotechnology.

(Dr Cunningham) Indeed there are.

240. It is well accepted in the medical area but we are in danger of running into a brick wall in this area if we do not handle it properly. You did say during the discussion at the beginning that the Government is not here to promote particular products and yet I put it to you that the benefits of biotechnology in crops and food production could be immense for us and particularly for the third world and we have not brought out the benefits enough this morning. Could the Government not influence the development of the biotechnology industry in the direction of producing beneficial crops which are safe of course and not damaging to the environment? We have been very concerned about the introduction of the terminator gene. I think that has given a lot bad publicity to the biotech industry. We could perhaps steer, through legislation or persuasion, the industry in the direction of producing more beneficial products which the general public are more likely to accept.

(Dr Cunningham) Matters of industrial policy, as I said, are for the DTI and not for me but of course the Government wants to create the right climate both in economic terms, in terms of support for our research and development effort, on which I am sure you know as a scientist and someone interested in science policy we are investing an additional £1.4 billion, and in terms of the regulatory framework, to allow these industries to flourish and be successful. They can make a huge contribution to our well-being, as you rightly say and I have already agreed myself, and not only to our well-being but, as one of your colleagues was saying in the Committee earlier, to the well-being of developing nations in terms of more efficient food production. So they do offer potentially very large benefits indeed.

241. It is not all industrial money which I agree with you we cannot directly influence. There is a lot of public investment in biotech in the universities and elsewhere in the research institutes. Surely we can influence the policy there in the public sector?

(Dr Cunningham) We certainly do have in the United Kingdom a number of outstanding university departments in the biosciences areas. In these areas we are very fortunate that we are among the world leaders in terms of the quality and range of our research. That is why the Prime Minister and I and other ministers want it to be clear that we simply cannot bring this hugely important effort all grinding to a halt, it would not be in the national interest to do so. So we must try to create the climate, the circumstance, in which properly

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[Dr Iddon Cont]

monitored, properly supervised, properly controlled, the existing opportunities can develop.

Dr Iddon: Thank you.

Mr Savidge

242. Your review of the Framework for Overseeing Developments in Biotechnology asked the question: "What gaps exist in coverage of biotechnology by the existing committees and how might these be remedied?" Do you feel there are any gaps and, if so, what are they and how might they be tackled?

(*Dr Cunningham*) I am not sure whether the Committee has been provided with this diagram.¹

Chairman

243. We have, yes, this is a complex diagram.

(*Dr Cunningham*) If you have you will see that it is a pretty complex diagram and had been thought hitherto to be comprehensive in its coverage. On the other hand, no-one has taken a significant look at it for some time so we decided to have this consultation about it to see whether, as it is presently constituted, it adequately covers things like ethical issues, for example, and whether the advice coming in the form that it does is coming from a sufficiently broad range of interests, for example. We have received a very large number of responses to the consultation and, as I have said, I hope by next month we shall be able to present a report and conclusions on it.

244. Talking of gaps, do you feel at present that Government policy contains a strategic overview of the effect that biotechnology will have on agriculture for good or ill, or might that be a gap? If it were a gap what ways do you think there are of addressing it or would the current review be intended to produce a policy?

(*Dr Cunningham*) The current review is intended to give Ministers advice on whether this Framework, which as we have all agreed is comprehensive and has been in place for some time, does actually cover all the issues in what I repeat is a very fast moving area of scientific and technological development. Whether we need to add to this Framework, whether we need to simplify it in some areas, whether there is any overlap that should be removed, it addresses all of those matters. As I said, we are currently in the midst of working on a paper on the responses that we have received. I cannot pre-empt the decision of my colleagues in the Committee on what is likely to emerge but, as I said earlier, it is my view that we are likely to propose some changes.

245. In the evidence that we have received we have repeatedly had two suggestions come to us, one being the stakeholder forum and the other being an over-arching committee to have a sort of strategic overview rather than just dealing with regulatory matters on a case by case basis. Could you perhaps indicate to us how serious you expect those proposals to be taken in the review?

(*Dr Cunningham*) It is very tempting to respond in some detail to your question, which is an interesting one

and an important one. I think it is appropriate, and to be fair to my colleagues, to ask you to be patient for just a little longer and await the outcome of the committee's considerations.

246. In reviewing the current arrangements for oversight, what sorts of assumptions have been made?

(*Dr Cunningham*) We have not made any assumptions. What we have said is we invite comments from anyone who wishes to comment who has a point of view to tell us what they think about this system without anything being ruled out at all. Is it right? Is it too complex? Does it do the job? Are there any loopholes, gaps as you say? Should there be an overarching body as some organisations have previously recommended? All of those things are up for consideration.

247. When you say nothing is ruled out, in effect would you say that the review is a fundamental reassessment of the actual questions that need to be asked or is it more about reviewing how the current system operates?

(*Dr Cunningham*) It is both.

248. Finally, given the obvious interlink between pesticides and this issue, is there any plan to review the relationship between the ACRE and the ACP? Is there any thought of possibly extending the responsibilities of ACP to cover indirect environmental effects given that is being done in relation to ACRE?

(*Dr Cunningham*) You know there has been some consideration of ACRE because under the Nolan rules a very large number of the members of ACRE have to go. In retrospect I think perhaps the committee should have been formulated in a different way to avoid what is now inevitable. Ten of the 13 members are now barred under the Nolan rules. They have served their term. I take this opportunity to express on behalf of the Government to Professor Berringer and his colleagues our gratitude for the work that they have done. That is the reason that they have to be replaced. Nolan made recommendations about public appointments and the Government is following them. We are not introducing any new rules about people who serve on our advisory committees, we are saying that as in the past we shall make a choice of membership of committees on the best people available for the role.

249. The point I was wanting to make was would it be helpful now, given the interlink between pesticides and this issue, for there to be some form of linkage between ACRE and ACP? Would it also be desirable possibly for ACP to have a responsibility for indirect environmental impacts given that has been given to ACRE?

(*Dr Cunningham*) There are some overlaps between the memberships of various committees. I cannot say off the top of my head whether it is the case in the two that you have referred to. It is not uncommon for us to have members of one committee sitting on another committee and vice versa so that there is some linkage, some continuity of thinking, across the boundaries of these committees. That is a sensible approach. If it is an approach that we need to develop in respect of other committees that is something we will consider.

¹ See Annex 2, p. 43.

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Dr Iddon

250. Can I just follow up a question on the use of the Nolan rules. Does not the application of the Nolan rules make it extremely difficult to get highly qualified people on the different Government scientific advisory bodies?

(Dr Cunningham) The Nolan rules in this case, in the case of ACRE, are simply coming into play because of the time that people have served on the committee. Let us be clear, there is no purge of ACRE going on. These people are not being removed because they have not been absolutely assiduous and independent in their work for the Government; their time is up under the Nolan rules and that is it. Any other interpretation put on the changes there is completely wrong. That is why I said a few moments ago that I wanted to take this opportunity to pay tribute to the chairman of the committee and his colleagues for the job that they have done. We are bound by the length of time for which people can serve, that is one of the Nolan considerations.

251. I was not referring particularly to the length of time, which I understand clearly, I was getting at the declaration of interests of different individuals on different advisory committees. I have noted some criticism of members of the Medicines Control Agency, for example, which I am dealing with at the moment in another sphere of activity, and some people say that some members are so close to particular aspects that they should not really be on the committee. I suppose you could use the Nolan rules to substantiate that.

(Dr Cunningham) You can take it that if there had been any problem or conflict with the Nolan rules they would not be on the committee in the first place, would they? That is my response to that, Brian. Everyone who is appointed to one of these public bodies these days has to pass the tests of the Nolan rules. What we cannot do, what the Government is clear we are not going to do so, is start erecting additional hurdles which would bar people from serving on advisory committees simply because they work in industry or because they have a university department research fund with somebody in industry. That would be an absurd thing to do. What we are saying is we shall continue, as before, to appoint the most appropriate people on the basis of their background and knowledge of the issues under consideration consistent with them meeting the tests laid down by the Nolan rules. You yourself as a former distinguished academic will know that if we started ruling out people on the grounds of their contacts with industry in science departments and universities, a whole swathe of some of the most eminent scientists in the country would be barred from giving the Government advice which would clearly be absurd.

252. What I was trying to get at was a strict application of the Nolan rules which would bar a lot of people with a lot of expertise.

(Dr Cunningham) Providing they declare their interests and they are well-known and laid out as the Nolan rules require I do not see any problem in calling on that expertise.

Dr Iddon: Thank you.

Mr Baker

253. Excuse me if I am being opaque or whatever Baroness Young's word was earlier on but is the change in membership of ACRE because the Nolan rules require them to not serve on ACRE or that their time is up or a combination of both?

(Dr Cunningham) They are time-limited under the Nolan rules.

254. So it is to do with Nolan time limits?

(Dr Cunningham) Yes and for no other reason.

255. What is the reason behind the ineligibility for membership of ACRE of direct employees of environmental pressure groups?

(Dr Cunningham) To the best of my knowledge there is a member of an environmental pressure group on ACRE now.

256. As I understand it, that is no longer going to be allowed unless you tell me otherwise.

(Dr Cunningham) I said in my earlier remarks that it had become the practice in Government to appoint non-specialist public interest people to all our advisory committees. It is a matter for the individual Minister or Ministers concerned whom they appoint. There is no actual rule which says a person fulfilling that role has to be appointed but looking at people around there is no rule either which says they cannot be appointed.

257. As far as you are concerned members of pressure groups are entitled to serve on government bodies throughout including ACRE?

(Dr Cunningham) What I am saying is that people serving in the public interest have a legitimate right to membership of government advisory committees. After all, it was I who made these changes in the Ministry of Agriculture and, for example, appointed someone fulfilling that role to the Bovine Spongiform Encephalopathy Advisory Committee exactly for the reasons we are discussing. So there is no reason in principle why any government committee of this kind should not have someone not as a delegate or representative of a particular pressure group but serving there in the public interest in the role which is now well established. None of these advisory committees has any rule or limitations on that kind of appointment.

Mrs Brinton

258. Obviously quite a lot of our discussions today have centred on the risks or perceived risks of GM products and foods but Dr Iddon mentioned earlier on that he felt that there were some considerable benefits and I noticed you reacted to that with some enthusiasm perhaps. Do you think, again returning to public perception, that the benefits of any GM application should be formally and openly assessed alongside the risks? How could we weigh up the risks and benefits in a way that is transparent to the public and would this actually be possible within EU legislation?

(Dr Cunningham) It is perfectly possible. There is nothing in EU legislation which can prevent us setting out what the benefits are. I think we were more concerned with public perception and concern rather than actual quantified or established risks but you can

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[Mrs Brinton Cont]

read the literature and you can read arguments for and against in scientific magazines what the benefits are. There is no bar on anybody arguing for what the benefits are. They are set out in many publications which are commonly available. Our advisory committees are there on the basis of trying to ensure that if risks do occur they are absolutely minimal. The committees are there to assess risks and problems only. ACRE and the Advisory Committee on Novel Foods and Processes are not there to promote the benefits of a particular product. As I said earlier, the Government is not in the business of promoting particular products. The committees that bring us advice in this area, the committees that we appoint are there to assess whether it is appropriate for this product or that crop to be grown having analysed all the risks, potential or real.

Mrs Brinton: Thank you.

Joan Walley

259. Could I just ask in terms of the environmental implications of biotechnology for agriculture, how much do you think that that is a matter for sustainable agriculture and should be dealt with accordingly and how much do you see this as a *per se* issue of biotechnology?

(Dr Cunningham) I am not sure that I understand the question. I am not sure that sustainable agriculture is an entity; it is an argument.

260. I would hope that it is an objective.

(Dr Cunningham) An objective, yes, but how would sustainable agriculture assess the situation?

261. I think that the concern—

(Dr Cunningham) Who represents sustainable agriculture is the question I am really asking.

262. That is a good question but I think the concern is really in terms of the benefit that we have just been talking about. This is something we explored with Baroness Young last week. There is a school of thought that sees there are considerable benefits for sustainable agriculture from the biotechnology industry but, equally, there is a down side to all of it as well. It seems to me on all these issues there has to come a time when a decision is made whether it is based on science or whatever it is based on. I wonder where you put the balance, if you like, in terms of the assumption that sustainable agriculture is something that we want to move towards and where you see the issue in respect of this whole biotechnology debate sitting or not sitting side by side with that objective of sustainable agriculture.

(Dr Cunningham) Some people would argue that sustainable agriculture should be organic production. As we know, the Soil Association, of which I am a member I might say, is implacably opposed to genetically modified crops. On the other hand, other people use a wider definition of sustainable agriculture of what we can sensibly and productively grow whilst not doing damage or irreparable harm to the environment, a much broader definition. What we say is the way the system works is this: there is never going to be a day when we have blanket acceptance of genetically modified entities. They are all going to be,

as now, assessed on a case-by-case basis, on a single basis. That is the way the approval system operates and there is no proposal to change that. If there is any doubt, as I have said on more than one occasion, about any of these products they would not be approved. In that sense the regulatory system is making a contribution in approving or not approving products to the development of sustainable agriculture.

263. In respect of the concerns that English Nature could have in respect of the biodiversity issue, bearing in mind that the UK is a very different place for agriculture than perhaps the United States is, how much weight would you give to any advice from English Nature that concerns about biodiversity generally should override any other concerns about the future viability and profitability of the biotechnology industry?

(Dr Cunningham) I think we must put concern about biodiversity very high on the agenda. English Nature are there to draw our attention to their concerns and they do so effectively. That has got to be high on the agenda. They would rightly argue that the increasing intensification of, say, non-GMO agricultural products has already done very significant damage to biodiversity, large inputs of fertilisers or pesticides, monocultures. You have seen the figures about the decline in bird life, for example. This is with what are now traditional agricultural procedures. We would not want to do anything which makes that situation worse. So that is very much a consideration for us in looking at these issues. I just said I am a member of the Soil Association, I am also a member of the Royal Society for the Protection of Birds, so I share those views very strongly.

Mr Baker

264. You will have had lots of representations from them in that case.

(Dr Cunningham) Indeed.

265. Following on Joan Walley's point, this is a very new and difficult area and it is complicated, we all recognise that. Would you accept that there is across Government—I am not trying to suggest this is different from any other Government—there is a wide variety of views across Government which partly reflects departmental responsibilities and the philosophical position they start from? Is it not the case that with everyone around this table and Ministers as well we would all draw a different benefit/risk line position?

(Dr Cunningham) I think there is a pretty large shared agenda on the part of Ministers on these issues, certainly in MISC 6. MISC 6 is not a committee that is given to violent and wide ranging diverse opinion, believe me. The Committee has worked very well so far in terms of expediting the business and identifying what we think the key areas are. I do not see any reason why that should change. Although you could rightly say that if you took a political party, all political parties, you might see huge divergences of opinion, and I have been involved in some of those myself in the past on other issues of some controversy, certainly in the committee we agree what the priorities for the committee are, we agree the agenda, and the committee works effectively

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[Continued]

[Mr Baker Cont]

together. No, we do not have big clashes of view—so far.

266. I am interested you say that because on occasions when I have asked the same parliamentary question of different departments I get answers in completely different directions.

(*Dr Cunningham*) You are absolutely right to say that different departments have different priorities, of course that is so. That does not mean that we are trying to move into an era of joined up Government. That does not mean that people are incapable of seeing across departmental boundaries into what are genuine legitimate concerns or aims and objectives of ministerial colleagues in other departments and coming to a common view on them.

267. I accept that in principle and I welcome the fact that this committee is being set up that you are chairing. I suppose the concern that I have is let us say you have an enthusiastic Minister of DTI whose job is therefore to facilitate trade, to promote the biotechnology industry, which is one of the world's leaders, and that is what he or she will do very enthusiastically, and then you have got someone in DETR whose job primarily from the briefing of civil servants is "you have to worry about this, Minister, look at this biodiversity hazard, we could lose this if you are not careful, we have to do this, slow this down" and everything else, then the two things are pointing in opposite directions. It seems inconceivable to me that you will not have Ministers coming from different directions and for the best of all reasons there is going to be a clash there, is there not?

(*Dr Cunningham*) Of course there will be differences of opinion from time to time. I might say that any Government Minister who is not enthusiastic is in the wrong job.

268. I have said there are differences of opinions though.

(*Dr Cunningham*) Yes, of course there are differences of opinion from time to time. Perhaps I have not made this point as strongly as I should. As Ministers on this Committee we are not a committee of experts necessarily sitting in sole judgment on these matters. We are guided by a considerable amount of very high quality advice in taking these issues forward and I think of the Government's Chief Medical Officer, the Chief Scientific Adviser as well as these advisory committees. We are fortunate in having a large body of top class advice on which to base our judgments. Whether one is coming from Ministry A or Ministry B, which as you

rightly say may have different priorities, the burden of advice cannot be ignored. It is part of my role as Chairman of the committee to ensure that it is not ignored.

269. That is what I want to come to the nub of it really, that if you have these different perspectives which come from different Departments, there is no problem with that, and they then come to this Committee, MISC 6. You gave a very direct answer earlier on that you cannot overrule colleagues. It seems to me if these colleagues of yours are signed up to their perspective, which they may well be, and if that perspective was different to other colleagues' perspectives and you are unable to overrule them or unwilling to overrule them, whatever the position may be, I do not really see what you are achieving other than a forum to discuss it amongst colleagues who then go back to their own departments maybe with their views modified but nevertheless carrying on as before.

(*Dr Cunningham*) No, that is a misunderstanding and I apologise if I have misled you. I cannot say to Secretary of State X or Y in the day-to-day conduct of their department, "I do not like what you do; you had better change it." I do not have that power. I think there is maybe one person in the Government who does but it is not me.

270. Lord Falconer perhaps?

(*Dr Cunningham*) It is not Lord Falconer either. Of course in the normal conduct of Government business Ministers will go to Cabinet committees, whether it is this or other committees, and they will fight their corner and the Committee may come to a different conclusion and of course that Minister or those Ministers have to accept the outcome of the Committee's decision because that is what collective responsibility is all about. Whilst I personally do not have the power to issue edicts to this Minister or that Minister, if the Committee comes to a conclusion all Ministers are bound by that decision.

271. Including DfID who are not on your Committee?

(*Dr Cunningham*) If they had a particular point of view and wanted to put that point of view to the Committee of course we would certainly listen to what they had to say.

Chairman

272. Thank you, Minister, that was a very useful session.

(*Dr Cunningham*) Thank you very much.

THURSDAY 29 APRIL 1999

Members present:

Mr John Horam, in the Chair

Mr Norman Baker

Mr Malcolm Savidge

Mrs Helen Brinton

Mr Gareth Thomas

Dr Brian Iddon

Memorandum submitted by the Department of the Environment, Transport and the Regions and the Ministry of Agriculture, Fisheries and Food

INTRODUCTION

The Department of the Environment, Transport and the Regions (DETR), together with the Scottish Office, the Welsh Office and the Ministry of Agriculture, Fisheries and Food, is responsible for the legislation governing the deliberate release and marketing of genetically modified organisms (GMOs). The purpose of the controls is to avoid adverse effects on human health and the environment which may arise from the release and marketing of GMOs.

To underpin implementation, the Department employs high quality scientific advice to inform decisions on individual applications to release and market GMOs, and to provide a basis for the broader policy-making process. The Department uses its scientifically qualified officials as case officers and policy officials, and seeks advice from its statutory Advisory Committee on Releases to the Environment (ACRE) which is composed of independent scientific experts.

STATUTORY RESPONSIBILITIES

The Genetically Modified Organisms (Deliberate Release) Regulations 1992 (amended in 1995 and 1997), together with Part VI of the Environmental Protection Act 1990 (EPA), implement the EC Directive 90/220/EEC (the "Directive") on the Deliberate Release into the Environment of Genetically Modified Organisms. Any person intending to release or market GMOs must apply for a consent from the Secretary of State for the Environment, Transport and the Regions for a release in England, or from the Secretaries of State for Scotland or for Wales for releases in Scotland and Wales respectively. For cases encompassing environmental and agricultural matters, the Secretary of State acts jointly with the Minister of Agriculture, Fisheries and Food. Separate legislation applies in Northern Ireland, but the effect is the same as the legislation in Great Britain.

The Deliberate Release Regulations set out comprehensive information requirements for notifiers, including an environmental risk assessment. Every consent issued includes the general condition that the consent holder keep himself informed of any risks of damage to the environment being caused by the release. The consent holder must also notify the Secretary of State if there is any information which would indicate a change in the level of risk. One or more specific conditions are also attached to consents to release, including requirements for post release monitoring and a report of the release. Applications to market GMOs are subject to the same procedure but must, in addition, be cleared at Community level. Specific conditions may also be attached to consents to market GMOs.

DETR takes the lead in environmental policy-making in the regulation of GMOs at the domestic, European and international level. Two of the key ongoing activities are the revision of the Directive, and the development of a Biosafety Protocol to the Convention on Biological Diversity which will provide for the safe transboundary movement of living modified organisms (LMOs).¹

SPECIFIC QUESTIONS

1. *Is there a need to develop a strategy for assessing and managing the environmental implications of the release of GMOs?*

Environmental risk assessment and strict risk management is key to the safe use of GMOs. The Directive requires a risk assessment to be carried out on a case-by-case basis as part of each application to release or market GMOs. A framework approach to environmental risk assessment was issued in a 1993 DOE/ACRE Guidance Note for UK applicants for consents to release or market GMOs. The Directive does not set out the

¹ Living modified organisms are essentially the same as genetically modified organisms.

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principles or methodology for risk assessment but the UK has strongly supported the work of a Risk Assessment Working Group to the Committee of Competent Authorities to develop Community risk assessment guidelines. The Commission's proposal to amend the Directive improves the current situation by providing for an annex setting out the principles of risk assessment. Furthermore, EU Environment Ministers agreed last December that Member States would already, when applying the existing Directive, take into account the underlying principles for risk assessment resulting from the work done in preparation of the Council of Environment Ministers in December 1998.

The Government considers that a common approach to risk assessment will help to ensure a thorough and harmonised appraisal of the risks that each GMO may pose to human health and the environment. It should improve the quality of notifications submitted, minimise the need for seeking additional information which has contributed to long delays in reaching decisions on marketing applications, and ensure that competent authorities take a more harmonised approach in appraising notifications.

These provisions mean that a strategy for assessing and managing the environmental implications of the release of GMOs is already in place; it is continuously reviewed and adjusted, if appropriate. For example, the terms of reference of ACRE were adjusted last year to extend their consideration of environmental effects to wider and indirect effects; a subgroup of ACRE is now looking at the wider impacts of the release of GMOs on biodiversity.

Should this strategy include the formal assessment of the environmental benefits of GMOs alongside their risks?

The current directive does not permit possible benefits to be taken into account. Releases of GMOs are judged solely on the basis of an assessment of the risks to human health and the environment which must demonstrate that the release will avoid adverse effects to the environment. There have been calls for, and the European Parliament has proposed, the incorporation of an assessment of the benefits in the revised Directive and the Government is considering whether to support the inclusion of such a provision.

2. *If so, does the Government have adequate mechanisms for developing such a strategy, in terms of:*

— *the co-ordination of existing policy and regulation.*

Adequate mechanisms for co-ordination of policy has been provided for a number of years through the Interdepartmental Group on Genetic Modification Technology which comprises officials from all interested Government Departments.

Last year, a Cabinet Committee on Biotechnology and Genetic Modification was established, chaired by the Minister for the Cabinet Office, to co-ordinate Government policy on biotechnology and to ensure consistency across Departments. A committee of officials from the Departments concerned supports this Committee.

As regards the co-ordination of regulation, a Memorandum of Understanding was agreed in 1993 between DETR, the Scottish Office, the Welsh Office, the Health and Safety Executive and the Ministry of Agriculture, Fisheries and Food; this sets out the administrative arrangements for operating the regulatory regime. This Memorandum has secured an effective system for a co-ordinated decision-making procedure.

— *oversight of, and influence over, the direction of development of GMOs.*

DETR, advised by ACRE, issues guidance which addresses developments that could pose a risk of adverse effects to human health and the environment. While these might not be of concern at the small scale and with strict risk management, they might be of concern at large scale and commercialisation. Researchers are therefore encouraged to avoid such developments. An example of this is the use of antibiotic resistant markers: ACRE concluded that while there is little or no evidence that antibiotic resistance genes can escape from crop plants under field conditions, the precautionary approach implies that since the antibiotic resistance genes are not necessary in the trial release or marketing of crop plants, they should be excised at an early stage in development.

— *the assessment of direct and indirect risks, including the cumulative impact of GMO releases over time.*

The indirect effects of GM crops on non-target species are already considered in the current regulatory regime where those effects may occur as a result of the crop itself. The current regime also addresses cumulative effects by considering the effect of a new GMO together with any interactions it might have with GMOs approved previously. For example, the risk assessment for a herbicide tolerant crop plant must take into account other approved herbicide tolerant crops and potential additive effects. Risk assessments submitted as part of

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applications to release or market GMOs are scrutinised by all Departments with a statutory responsibility under the Memorandum of Understanding.

The Commission's proposal for the amendment of Directive 90/220 requires risk assessments to take account of direct and indirect, and immediate and delayed, effects of GMOs. The Government fully supports the inclusion of the indirect and cumulative effects in risk assessment requirements in the new Directive, and is committed to taking account of the broader environmental impact of each release before issuing a consent.

— *The contribution that GMOs might make to more sustainable agriculture?*

Genetically modified crops have the potential to contribute to sustainable agriculture in a number of ways.

At present, weed control relies on a combination of selective herbicide usage and cultivation practices. GM crops will permit the use of non-selective herbicides on the crop at the stage when the weeds are actually growing. It will be possible to target applications more precisely on the actual weed incidence, thus potentially reducing herbicide usage, and to use herbicides which are more biodegradable. Later herbicide treatment will allow some weed growth with benefits to biodiversity during the early crop growth stages.

GM crops will facilitate the introduction of reduced cultivation and direct drilling techniques, which will have benefits by reducing the number of tractor movements and consequent soil compaction, and reducing the soil erosion, nutrient leaching and carbon emissions which result from conventional cultivation.

More generally, genetic modification has the potential to develop plants which are more resistant to pests and diseases, and thus reduce the need for chemical treatments to control these problems. It opens the way to improve the production from plants of renewable raw materials which are currently derived from fossil sources.

3. *What mechanisms exist, or are needed, for incorporating public values and concerns regarding the environmental implications of GMOs, alongside the results of scientific assessment, within the decision-making process?*

The Regulations require that all applications to release GMOs are advertised in a local newspaper within 10 days of the application being submitted to the DETR. Information about proposed releases and applications to market GMOs is placed on public registers held at the regional offices of the Environment Agency and on the DETR web site in sufficient time to allow public comment. The advice from ACRE to the Secretary of State about whether, and under which conditions, a consent should be issued is also placed on the web site and the public registers before a final decision is taken. ACRE's scientific advice and all comments received from the public are taken into account in making that final decision.

4. *What is feasible and desirable in terms of preserving consumer choice by segregation and labelling—particularly the issue of “labelling for process” to provide for consumer influence over the use of GMOs and their environmental implications?*

It is the Government's policy that every product containing a GMO should be clearly labelled and the UK is pressing for this in negotiations on the amendment to Directive 90/220/EEC. In addition the Government is determined to ensure that all foods containing genetically modified (GM) material (protein or DNA) are clearly labelled to enable consumers to make informed decisions about the foods that they eat. Detailed rules (EC Regulation 1139/98) for the labelling of ingredients obtained from GM soya and maize came into force on 1 September 1998 and will set a precedent for all future approved novel foods. All Member States and the European Parliament agreed that labelling should be triggered by the presence of GM material. In the case of refined products such as oils, which contain no genetic material and are equivalent to existing food products, the UK accepts that labelling is not required. A statutory requirement to label ingredients which do not contain GM materials would in any case be unenforceable. The Government is pressing the European Commission to develop detailed labelling rules for additives and animal feed as a matter of urgency.

The Government appreciates the difficulties associated with obtaining the segregation of GM and non GM crops on a large scale. This does not alter the Government's view that segregation would have been a better way to introduce GM crops into the UK market. However, the Government is satisfied that as all GM crops and foods currently on sale have been subject to a rigorous safety assessment, there are no safety concerns to warrant imposing segregation as a condition of approval. On this basis we believe that any attempt to impose segregation as a condition of import would not be defensible under WTO rules.

The Supply Chain Initiative on Modified Agricultural Crops (SCIMAC) code of practice will help ensure identity preservation and clear labelling throughout the supply chain of all genetically modified crops grown in the UK.

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5. *What scope does the UK and EU have for policy initiatives, and what are the prospects for multilateral agreement, on the release of GMOs into the environment—with particular reference to the World Trade Organisation and GATT disciplines and obligations?*

The UK can take initiatives in the European Community within the framework laid down by the Directive through the committee of competent authorities which meets regularly to exchange information and experience on the implementation of the Directive. In addition, the UK plays an active role in the negotiations on the amendment to the Directive.

Beyond the EC, the UK has been proactive and promoted multilateral action in biosafety. As a follow-up to Agenda 21, the UK and Netherlands developed draft International Technical Guidelines for Safety in Biotechnology which were adopted by UNEP in 1995. The UK also strongly supported the decision taken in 1995 by the Conference of Parties to Convention on Biological Diversity to develop a Biosafety Protocol to provide for safe transboundary movement of living modified organisms and to establish advance informed agreement (AIA) procedures.¹ The UNEP guidelines and the Protocol will be complementary and constitute the major elements of the international biosafety framework.

In the negotiations on the Biosafety Protocol, the UK, as part of the European Union, has pressed for the protocol to cover the transboundary movement of all LMOs that may have adverse effect on the conservation and sustainable use of biological diversity with advance informed agreement from a Party of import prior to the transboundary movement of LMOs intended for intentional introduction into the environment, including those for use as food, feed or for processing. The EU wanted the Protocol to draw on the precautionary principle and to require that documentation accompanying a shipment of LMOs specify the presence of LMOs. In addition, the EU supported an enabling provision for international rules on liability and redress but opposed provisions that would subordinate the Protocol to other international agreements. The aim is a protocol securing environmental safety which will not hamper trade.

The Government greatly regrets that the meeting in February of the extraordinary Conference of the Parties in Cartagena, Colombia failed to reach agreement. The session was suspended and will be reconvened no later than the fifth ordinary meeting of the Conference of the Parties in May 2000, with a view to concluding negotiations.

The Government considers the suspension of the meeting a setback both in the context of biosafety and of other multilateral environmental agreements but it will do all it can to secure agreement on an effective and workable Protocol at the earliest opportunity.

The Directive is consistent with WTO rules. The UK is striving to promote ways of taking environmental considerations into account in multilateral trade agreements and pressing for trade and the environment issues to be addressed in any new Trade Round.

6. *Are there adequate arrangements for civil liability for environmental damage caused by GMOs?*

Liability is currently governed by the general civil liability rules which exist in the United Kingdom. These include the common law of tort as developed by the courts (including the law of negligence and the strict liability rule laid down in the case of *Rylands v Fletcher*). Depending on the facts of a particular case, the statutory regime for product liability may also be relevant. The Government is not aware of any civil liability cases on GMOs having been brought so far.

The European Commission is expected to publish a comprehensive White Paper on environmental liability, which is likely to cover damage arising from GMOs. The Government notes the delays that there have been in the preparation of this paper and that the European Parliament has proposed a specific liability regime in the context of the revision of the Directive governing the release and marketing of GMOs. The Government is mindful of the concerns about biotechnology and the calls for secure liability measures. At the same time it recognises the inherent problems in drawing up detailed measures; these could lead to significant delay in agreeing amendment of the Directive, on which the Government remains committed to rapid progress. The Government is therefore considering whether specific GMO liability provisions are necessary and how best to approach remediation of the various kinds of damage on a consistent basis.

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¹ Advance informed agreement means notification to the competent authority in the Party of import about an intended transfer of LMOs. The notification would include details of the LMO and the potential receiving environment, and a risk assessment. Only if the Party of import gives consent would the transfer be allowed to go ahead. If the Party of import did not respond, the movement would not be allowed.

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Examination of Witnesses

THE RT HON MICHAEL MEACHER, a Member of the House and of the Committee, Minister for the Environment, and DR LINDA SMITH, Head of Biotechnology Unit, Department of the Environment, Transport and the Regions, and MR JEFF ROOKER, a Member of the House, Minister of State, and MR HENRY BROWN, Head of New Crops and Sugar Division, Ministry of Agriculture, Fisheries and Food, were examined.

Chairman

273. Good morning, Ministers. Welcome to the Committee, and officials as well. Is there anything by way of a short preliminary statement that either of you would like to make before we kick off with the questions?

(*Mr Meacher*) I think this has been sufficiently talked about, Chairman. I doubt if there is a great deal new to say.

274. You mean you have had no new thoughts since Monday?

(*Mr Meacher*) I will forgo that opportunity for myself.

(*Mr Rooker*) I agree.

Mrs Brinton

275. I am not going to kick off on food safety because that is not the focus of this inquiry. Could both of you start by defining how you interrelate, what your respective responsibilities are in relation to the environmental impacts of the release of GMOs? How do you relate and take decisions bilaterally and how do you take those decisions and communicate with other Departments? Obviously here I am particularly thinking of the DTI.

(*Mr Meacher*) Perhaps I could start. My responsibility is obviously on the environmental side of the House. All notifications for consents to release or market GMOs have to be examined by ACRE, the Advisory Committee on Releases to the Environment. Extensive information is required from notifiers and they have to provide an environmental risk assessment which of course is then examined by ACRE. The issue of an approval, if it is granted, is granted by the Secretary of State on the advice of ACRE. We are governed also internationally by the European Directive 90/220 and this is if I may say quite a timely discussion of this issue because it is currently being revised in Brussels. We have already had extensive discussion of this in the Environmental Ministers Council, particularly at the December meeting of last year. The international aspect of this is also governed by the proposed Biosafety Protocol which broke down in Cartagena in February. I will not go into that further at this point unless you wish me to. That is basically the framework from the environmental side. We liaise extremely closely with MAFF both at official and Ministerial level.

Chairman

276. By what means? What are the mechanics of it?

(*Mr Meacher*) The mechanics are that submissions made to ACRE are certainly known to officials in my

Department and to MAFF. They have extensive, I am sure almost daily, discussions; this is a fast-moving area, and of course any submissions that MAFF, on its side, wanted to make in regard to those notifications would certainly be fully considered. Jeff and I would certainly, and have done, repeatedly meet together under the new Biotechnology and Genetic Modification Cabinet Sub-Committee that has been set up. We are now meeting regularly and all of these issues are discussed. We are the two lead Departments but of course it also involves DTI, the Department of Health and the territorial Departments.

(*Mr Rooker*) As Michael has said, DETR leads very much on the environmental and release side. We were meeting regularly, by the way, before the Cabinet Sub-Committee was set up. I just add that as an aside, particularly in view of the fact that we spent several months getting ready to give evidence to the House of Lords Select Committee in October last year. As far as MAFF is concerned, we have the Plant Variety Rights Office and the Seeds Division, so there is responsibility there for MAFF. There is a GM aspect there. There is clearly the Pesticide Safety Directorate which MAFF leads on but where decisions are all taken collectively with DETR, the Department of Health and the Welsh and Scottish Offices. MAFF is the lead but the decisions are made collectively. There is obviously a major pesticides issue on GMOs as I have no doubt we will touch on this morning. There is the MAFF New Crops and Sugar Division headed by Henry Brown on my right, which essentially deals with the agricultural introduction of GMOs into United Kingdom agriculture, which is how come we ended up leading on the SCIMAC and the rules there. Of course in MAFF there is also the Additive and Novel Foods Division dealing with the foods themselves but very much tied up with the Department of Health because there is a single management structure in the Joint Food Standards and Safety Group. MAFF has not taken decisions on food unilaterally since September 1997. That cannot be repeated often enough. In advance of the Food Standards Agency there is a wholly different management structure across the two Departments headed by a single manager reporting to two Ministers.

Dr Iddon

277. Can I look at the Cabinet Committee? I think it was during the Greening Government initiative, Michael, that we challenged you about the number of times that ENV had met. It did not appear to have met in fact and I think you pointed out that most of the work was done by passing paper between Ministers. By contrast the new Committee, MISC 6 as it is termed, set up just to look at this issue, has already met five times and Jack Cunningham told us on

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[Continued]

[Dr Iddon Cont]

Tuesday was likely to meet three or four times in the immediate future. That is a complete contrast. You also told us that the lack of meetings of ENV was probably an indication that everybody was pretty happy about the policies in that area. Do we take the fact that MISC 6 has met so many times as an indication that the Government is very concerned about this area and that we have to meet more regularly to get it sorted out?

(Mr Meacher) Basically you are probably right. The reason ENV does not need to meet very much is that there is a high degree of consensus. We can clear it by correspondence. If there were significant and important differences we would have meetings. That has not proved to be necessary. In the case of Biotechnology and GMOs, this is a much more fraught area. There is a great deal of controversy. There are two sides of this argument being very fiercely fought out, quite extreme on both sides in my view, and there is a great deal of uncertainty about what the truth and the facts really are. That is of course we have the farm-scale plantings. I think we do need to have a very much hands-on attitude to this because certainly weekly, almost daily, the pattern is changing.

278. Why was ENV not allowed to handle this situation since there already was a Cabinet Committee dealing with the environment?

(Mr Meacher) I think this is perfectly clearly a specialist area. I personally think it is sensible for it to have its own Cabinet Sub-Committee. I think ENV is a much more generalised area and has a huge spectrum. It virtually covers everything. This is a highly specialist, very controversial, detailed area. I do think it is right to have a committee focus on it.

279. Could we move on to looking at biodiversity for a moment? How important do you think it is to allow agriculture and wildlife to co-exist in this country side by side in order to meet our national, European and international obligations when other nations, particularly America, separate their agriculture from their biodiversity because they have such large prairies for example?

(Mr Meacher) Dr Iddon, you have answered your own question very well. If we were a country the size of the United States we would have the opportunity to do exactly what they have done. We are not like that. We are small islands, we have 60 million people jostling about with one of the highest population densities in the world, and the countryside and the towns jostle together cheek by jowl. The fact is that 80 per cent. of the terrain of the United Kingdom is farmed; it is a very high proportion. Therefore we simply do not have the luxury of that separation and we have to look at the linkage between farming and wildlife extremely carefully and regulate it accordingly. It has always been so, it is not a new thing, but GM only intensifies that requirement.

280. English Nature are of the view, and I think most of us would agree with them, that changing agricultural practices have brought us to a crossroads with respect to biodiversity which has been on the decline for over 30 years and we are all very anxious about certain species disappearing, and of course the

Government has released new indicators to measure that, particularly the headline indicators. Would you agree therefore that positive policies are now necessary to reverse this decline?

(Mr Meacher) Absolutely. There is no question that we have got to reverse this decline. As you say, certain farmland bird species have reduced in the last 50 years by as much as 50 per cent., I think in one case by even as much as 80 per cent., and these are plummeting reductions in numbers brought about primarily, let us be clear, by the intensification of agriculture which has occurred in this and other European countries since the war. That is overwhelmingly the main cause. I think it has been reinforced by the CAP and of course the United Kingdom Government is looking very strongly for a reform of the CAP and a move towards a more agri-environment sensitive kind of farming. GM has to be assessed against this background as to whether it adds incrementally to the underlying causes. On that we simply do not know. That is quite explicitly the purpose behind the farm-scale plantings that we are carrying out over the next two or three years.

Chairman

281. Mr Rooker, do you agree with what Mr Meacher has just said about the decline in species and the need to reverse this?

(Mr Rooker) Yes. We know the cause of it. It is the common agricultural policy, intensification of farming. It is fairly obvious. There has been far more damage done to wildlife and the environment in this country as a result of the CAP than there ever has been, given the state of the situation of the science.

282. That is history. I was asking do you agree with him on the need to reverse this?

(Mr Rooker) Absolutely, if it were possible. Going for cross-compliance is probably not on in CAP. I have visited farms operating within the LEAF scheme and I have come away thinking, "Why cannot all farmers be required to operate like this before we pay the subsidies?"

Dr Iddon

283. Then we come to a fundamental difficulty with the introduction of GM crops, if that is going to happen, in that the farmer wants nobody to eat the crops but ourselves. He wants to keep all the predators off. That is the dream of the farmer, I think. But of course that contradicts the requirement to increase biodiversity. One of the worries of the public must therefore be that if we are introducing GM crops (which industry wants us to introduce and we will come back to how Government can influence that) there is a possibility that biodiversity will decline even further if the wrong crops are introduced.

(Mr Meacher) Either the wrong crops or the use of pesticides which are extremely toxic and very effective and, it is said, could wipe out all plants and invertebrate life within the field, and what effect will that have therefore on food for birds, for example? That is exactly an issue which we need to test. We are

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[Continued]

[Dr Iddon Cont]

going to come on to this, I am sure, but we are having an equal number of GM and non-GM crops grown as near as possible in comparative circumstances and we will be testing exactly what is the incremental effect of using these powerful pesticides, such as Roundup, glyphosate, which is very effective, in terms of the impact on farmland biodiversity.

(Mr Rooker) Can I just add to the point about MISC 6 because it is important. I would not want the Committee to run away with the idea that MISC 6 was set up because GM is a controversial issue. We announced, when we appeared before the House of Lords back on the 22 October, in the setting up of that Committee that that did not happen overnight. The idea of a need for Government co-ordination emerged in discussions in MAFF back in about May last year, the reason being that we had been asked to approve one of the pesticides for the GM crop before the crop had been approved and therefore we were looking at our own policy because it is the issue of going back with pesticides to re-regulate any pesticide that would be used on a GM crop. There was also the issue that we had previously, in 1997, consulted as to whether or not there should be any different rules for growing these crops, namely the herbicide tolerant GM crops, for a six-month period up until the end of 1997, and we were having the discussions emerging from the industry group. It was necessary to say that the GMs are coming up in lots of different areas and we need to see where each one fits in the big picture. The suggestion for better Government co-ordination via a Cabinet Sub-Committee was there on the table just before the reshuffle of last summer, when obviously, with new Ministers arriving in Departments, they have to be comfortable with the issues and decisions and get briefed. That took a few more weeks to go through the Government machine. This emerged not in any way as a reaction or because there was a crisis, but simply because of pressure points because frankly no-one was paying any attention. The whole issue of what we have been doing since 1997 has been open and transparent and press released and virtually ignored; I do not say exclusively, but it was not brought up because of any controversy. On the other issue about the number of meetings, I do not know whether Jack pointed this out but, because it was a new Committee, at our first meeting we set a programme of work for officials to take the review of the regulatory system, for example. That necessitates early on probably more meetings than would otherwise be the case with a run of the mill committee, if I can put it like that. I do not think we are meeting in crisis but Michael and I and other Ministers probably meet on a weekly basis on this issue.

284. Could I just explore this question of sustainable agriculture a little further? Both English Nature and the Chief Scientific Adviser whom we have taken evidence from describe current agricultural practice as unsustainable and you have given an indication that you would agree with that. Therefore you would also agree that there is a need for a sustainable agricultural strategy. I think you have agreed with that as well. Do you see that

biotechnology can play a part in a sustainable agricultural strategy?

(Mr Meacher) Again all I can do is repeat that the farm-scale plantings are an extended test in real life, not on a laboratory basis but the real thing, precisely to try and answer that question. Does genetic modification, together with the pesticides that go along with it, add to the underlying problem of the decline of biodiversity? Allegations have been made on both sides. Some say it can actually assist. Others will certainly say that because of the comprehensive impact of the pesticide and perhaps to do with the nature of the crop that there could be a long term decline even further in biodiversity. We simply have not got the systematic, detailed, national sample of data in order to test that out.

285. In my view, and I think in your view too because you say in your memorandum that there are some positive contributions that GM biotechnology can make and you specifically mention in your memorandum reduced herbicide treatment and no-till agriculture and reduced energy through chemical and other use, in order to reap the positive aspects of biotechnology in the food production world we are going to have to put some pressure on industry and other policy makers in this area. Would you agree with that and, if so, how is the Government intending to do that?

(Mr Rooker) First of all, we are doing the trials to find out information and to identify if there are any problems that are unforeseen that we can take action on. It is a very precautionary approach that we are taking regarding growing of these crops. There are claims made overall for the crops that, in the round, far fewer pesticides and herbicides would be needed.

Chairman

286. Is there any evidence for those claims?

(Mr Rooker) I will come on to that. We have not got any evidence because we have not done the trials. That is one of the reasons for doing the trials. There is evidence in the United States, where they have grown the crops for some considerable period of time, but it goes beyond that. There are guesstimates being made of less tractor movement, less tillage of the soil, as a result of these crops because the nature of the herbicide to be used may be that the time at which they are applied, the seasons in which they are applied, could be different from the norm and therefore there will be changes brought about. We need to know about those changes before there is large scale commercial cultivation. That is the reason for the trials. We also set up and announced when we went to the Lords—and I am sorry to keep referring back to that but this was an important announcement that we made on that day when we jointly appeared before the Committee in the other place—that the Pesticide Safety Directorate was going to improve the pesticide usage survey, make that more intensive in respect of this, and secondly produce a paper for consultation, which they did just before Christmas, on the pesticide impacts of these crops. That is out at the moment for consultation. We are going to watch this very carefully. Claims are

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[Chairman Cont]

made that are advantageous, if you like, in respect of using fewer pesticides. There may be pesticides, maybe put on at different times of the day, different times of the year, and therefore those changes have to be noted. Those claims have to be tested. We have to know whether they are correct because people on the other side will make claims that you will end up using more. That is part of the reason for the trials. The trials are not simply to grow, look at the crop, check the pollen, check distances. There is far more work planned for the trials than that. It is crucial that the claims made for these crops are tested before they are allowed to be grown on a large scale, commercial basis.

287. There is another fundamental conflict that I raise with you and that is, if we allow industry to develop GM seeds, GM crops in general, they will do it to make the maximum profit because that is what they are in business for, to make maximum profit for the shareholders. Unless Government influences GM biotechnology in a favourable direction, we will get the wrong kinds of crops. I am putting it to you that Government should try to influence the kinds of GM crops that are going to be grown.

(Mr Rooker) Put it this way: I do not want to throw a spanner in the works, but in some ways there is an area of crop development that could be just as "damaging" as GM because there are herbicide tolerant, non-GM crops. They are not part of the GM scenario and the regulatory process. Those crops have been done by natural selection, but they are herbicide tolerant. All the environmental effects we are talking about with GM crops could be just the same with non-GM herbicide tolerant crops, so you have to ask yourself: what is the problem? Is it the herbicide tolerance or is it the genetic modification? This is an issue that does require addressing. That is one of the reasons why we have asked ACRE in future to look at these crops. Michael is much more expert on this than I am, but they are not part of the Deliberate Release Directive because they are not GM. They are herbicide tolerant and the effects on the environment can be just the same, so it is not a question of Government saying to the biotech industry, "Get yourself sorted out so that you do not damage our environment" because frankly I do not think there will ever be a free-for-all on the planting of these crops in the long distant future. I cannot conceive of that simply because, even when we are over the farm-scale trials, and let us say there is what we would all understand as commercial development of farmers choosing, they will be subject to restrictions from the industry and in the long term may be subject to a much wider legal framework which we have not got at the moment. We are not able to put that in place.

Mr Baker

288. Just picking up on that point, Minister, very quickly, as a consequence of your Department looking into this matter in detail have you considered introducing further controls on non-GM crops which are produced by conventional breeding which may have similar (or even worse in some cases)

environmental consequences? You have just raised yourself the question of herbicide resistant crops which are developed by conventional breeding. Perhaps we ought to be looking as a country at producing controls on those sorts of crops as well.

(Mr Rooker) Yes. This is why, as I say, I do not want to throw a spanner in the works but the letters "GM" send out frissons to people and yet there are other things going on which affect the environment but which there is not the interest in, if I can put it that way. The answer to your question is yes, because we have required ACRE to look at these issues of herbicide tolerance even though they are not genetically modified. That is a very important aspect as far as the environment and agriculture and biodiversity are concerned.

(Mr Meacher) We did actually write that into our response to the House of Lords report, that we were asking ACRE specifically to look at the environmental impact of non-GM herbicide tolerant crops.

(Mr Rooker) I am reminded by Mr Brown that the SCIMAC guidelines actually cover non-GM herbicide tolerant crops. They are not exclusive to GM.

Mrs Brinton

289. I should like to refer to the Cabinet Committee and ask you what sort of general rules and guidelines, protocols and agreements have been set out for the presentation of policy. Mr Meacher has used the word "uncertainty" today, which I thoroughly endorse and agree with in terms of, shall we say, the GM future. But if we look a little earlier in the whole process we have had the Prime Minister intervening in the debate with a ringing endorsement of GM food, actually saying I believe that they were in his own cupboard at home and saying that they were healthier too. Yet yesterday, at Prime Minister's questions, I certainly felt that in response to the Leader of the Opposition, choosing to go on GM foods, that the Prime Minister was presenting a much more cautious view on the whole GM landscape. How is policy co-ordinated in terms of presentation? What are the mechanisms for that? Has there been a shift or is it just a shift of presentation?

(Mr Rooker) If I could kick off on that in respect of foods, the answer is no. I have to make this abundantly clear, that even with the recent announcements of food companies, nobody, whether Iceland or Nestlé, has made policy changes on the basis of food safety. Nobody has come up with any evidence regarding the safety of the three products and the one technique that are currently approved in this country in respect of food, and of course were approved some considerable time ago under probably a more closed regulatory system, firm enough so far as we are concerned but not as open and transparent as what we have brought about since May 1997. The issue is one of trying to play off food safety arguments apropos concerns for the environment. It is mixing those two up that is very unfortunate for getting clarity into the debate. People are concerned about food safety, and rightly so, simply because of the history of the recent past and the reasons we are setting up the Food Standards Agency. We are satisfied that the

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foods that have gone through the regulatory process are as safe as their non-GM equivalents. There is no shift whatsoever in that. We have not approved any new foods since May 1997, which is a shock to people to find out, nor indeed have we approved any crops for commercial planting, and it is the question of trying to dislocate the argument about the environmental impact of growing these crops, because obviously all the foods we use at the moment are imported, from the food safety issue. When the issue was first raised in the current round on 3 February, following the early morning adjournment debate, the issue was put by locking in food safety and environmental issues. It is the unlocking of those so that we can have a sensible debate on both, where there are quite different regulatory systems, that is important. In many ways, as we would freely admit, there are more concerns on the environmental aspects of GM than there are on the food aspects of GM in respect of the regulatory process. This is self-evident and I do not think anything the Prime Minister said yesterday in any way deviated from his previous response on this. The attempt is to try and make sure that we deal with the foods and the environment as quite separate, distinct issues.

(Mr Meacher) This whole controversy has caused us to look at whether the regulatory structure which we have at the present time is the best we can have. We certainly do not want to give the impression that the structure that existed before was deficient or failing; I do not believe that, but was it optimal? Were there gaps? Were there unreasonable overlaps? How far could it be simplified? How far could it be made more transparent? We are putting a great deal of emphasis on transparency. These are the issues that we have been concerned with and that is why the biotechnology framework review was set up on the 17 December. Of course we have to find ways particularly of taking account of the stakeholder interest as opposed to the regulatory scientific or technical interest and also ethical concerns which have been expressed. Where do they fit into this pattern? That is what we have been looking at.

Chairman

290. Mr Rooker, you told us last year when you came to this Committee that the Government was not in the driving seat where biotechnology or genetic modification were concerned.

(Mr Rooker) Correct.

291. That remains your view, does it?

(Mr Rooker) Yes. Not only does it remain my view, but it was the view that endorsed by Jack Cunningham when he appeared before you. So far as the science is concerned and taking the science forward, that is a matter for the companies concerned. The Government is in the role of being the regulator and the guardian of the public interest in respect of the safety of individuals, our food and the environment.

292. How do you view that, Mr Meacher, that the Government is not in the driving seat on these matters?

(Mr Meacher) It is self-evidently the case that Government does not control the whole of these

developments. Our concern is to regulate it in order to ensure that there is no risk to human health and no lasting or significant damage to the environment. I agree with what Jeff said earlier, that those controls are going to have to remain in place indefinitely. This whole process has been driven by forces outside Government. Our concern is to ensure that it does not damage consumers, that the public health is protected and the environment.

293. But does that not *prima facie* mean that there should be a strategic approach as opposed to a case by case approach?

(Mr Meacher) We have both. The case by case approach is the examination of each notification that goes to ACRE. The strategic approach is the review of the regulatory framework which you are looking at, or the advisory committee framework.

294. That is not yet a strategic approach, is it? It is examining whether you need a strategic approach.

(Mr Meacher) No. We are accepting that we need a strategic approach.

295. But you have not got one.

(Mr Meacher) That is exactly what this framework review is looking at: whether the strategic interests are properly represented at the present time and, if not, what strategic bodies should be put in place.

296. Clearly you are not sure. You are reviewing it because you are not sure.

(Mr Meacher) I think we are reasonably sure.

297. You cannot have it both ways.

(Mr Meacher) But we are about to make a statement which I think Jack Cunningham referred to. We are going quite shortly to make a statement on this issue which will certainly have reference to the strategic issue you referred to.

298. But clearly you would not be reviewing it if you were absolutely certain you were covering it satisfactorily.

(Mr Meacher) That is true.

(Mr Rooker) But on the other hand, the Government funds science, obviously, but the commercialisation of that science, which is the effect of what we are discussing here this morning, essentially is a matter for the companies concerned. The Government is not ordering companies to think up and invent genetically modified foods. What we need to do in this country is to encourage people to use the science, be it the blue sky science research or whatever, to sustain the lead on as many scientific areas as we can and do something this country has been abysmal at: actually getting some of the benefits back later on in the exploitation and commercialisation of the science, but do it in a safe way.

Mr Baker

299. You are not in the driving seat and I would not accuse either of you of taking a back seat on this. You don't look like passengers. It strikes me you are probably outside the vehicle altogether, which is in a way quite worrying. Would you share my view that there are in fact democratic deficits in this whole issue

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because what we have is a small number of multinational companies, largely based overseas, who are driving us forward with huge resources at a rate of knots which the democratic system in this country, irrespective of whatever Government it is, is simply not capable of dealing with? To a large extent we can try to put regulations in place, we can try and make available a choice, but at the end of the day the decisions are being taken by people outside this country.

(Mr Rooker) No. The decisions on what is grown in this country, what is sold and consumed in this country, are taken by the Government. The democratic deficit is not there in the way that you have put it.

300. They are not taken by the EU and the World Trade Organisation?

(Mr Rooker) Yes. That is part of the system, but the regulatory system of what gets grown in this country and what gets sold in the food shops of this country is taken by the United Kingdom regulatory authorities, and if they have got a problem they do reject applications that come forward, and we are governed within the European Union but no-one is going to argue that that is democratically perfect but it is a lot better than each of the 15 Member States being played off against one another.

(Mr Meacher) I would deny that there is a democratic deficit here. I think there has been a regulatory structure in place, partly provided by Directive 90/220, partly by the Deliberate Release Regulation of 1992. What we have done since we have been in office is to review whether that is optimal. There is no question: it is robust, it is pretty comprehensive, but is it at all levels, including at the stakeholder level, working properly? With regard to the EU, the important point is that notifications for marketing of GM products have to be approved under Part C of the 90/220 Directive in the EU. A notification is made to a Member State. The competent authority carries out an evaluation of risk assessment. That information is passed to the Commission and circulated to all the other Member States and the competent authority of any of those Member States can then raise objections.

301. But it is done by qualified majority voting.

(Mr Rooker) At the end of the day, yes.

(Mr Meacher) It is an important point and perhaps I could go through this. If there is an objection then the matter is raised with the Commission. The Commission will then put a proposal to its own regulatory scientific committee. That will then be discussed by the competent authorities before they vote. If there is not—and this is the point you are making—a qualified majority vote in favour of granting the consent, then the Commission proposal can be put to the Environment Ministers meeting in council and it is perfectly true that under the current Directive all that is required is one single Member State to support it, and of course the state which originally agreed the application is very likely to do that. We believe that that is wholly undemocratic. I think that is a serious weakness in the existing regulations.

302. A democratic deficit.

(Mr Meacher) One more sentence. And it is therefore proposed, and we are strongly supporting, that there should be a change in the comitology that in those circumstances, where there is not agreement between the competent authorities, instead of it merely being decided by the Commission and one Member State, all Member States should play a part in this and the result should reflect the balance between the Member States so that if there is a majority that are against, that would prevail.

303. I support that position, but I think you have identified for me a democratic deficit more adequately than I could have done myself, Mr Meacher. Can I come back to the strategic approach which was referred to by the Chairman a moment ago? I remember asking you, Mr Rooker, a question last year as to what percentage of agriculture in this country would be GM orientated within, say, 10 years, and I was given an answer, "I could not possibly know and could not possibly speculate." Nevertheless, everybody accepts that growing GM crops is going to have a significant impact, for better or for worse, on our countryside and all sorts of other consequences we can labour at length. Is it not the case therefore that that is an example where there is no strategic approach, because surely you need to understand where agriculture is going. Our farmers need to understand that.

(Mr Rooker) Yes, but the answer remains the same. We have about 4.6 million hectares under cultivation in this country. Most of it is cereals. We have no idea at the present time about, if you like, the graph of growth of GM crops because essentially that graph and the angle of it are subject to the farm-scale trials. They are subject to what happens after the farm-scale trials if you see what I mean, because obviously everything cannot be done in one year. It is subject to the number of crops that get approval. If one sticks to oilseed rape and maize, and throws in the other one which could possibly be sugar beet, the total area of cultivation of those crops is about 800,000 hectares, so it is a fairly substantial percentage of 4.6 million. I am not saying they will all be GM, but I am saying that those are the crops that are likely to be in the early days subject to GM. Not necessarily all of them. We have no idea. No-one will be able to know, until we have done the farm-scale trials, because the farm-scale trials will form part of the regulatory process. It may be—I do not know—that the result of the trials is that we have either larger distances or some counties in the country where we say, "In this county, sorry, but the terrain is such that no GMs should be grown." We do not know. We are seeking to find out the information and therefore guesstimates of what the likely percentage of agriculture is going to be genetically modified frankly cannot be made by anybody.

304. I want to come back to the farm-scale trials later on if I may. Some of our witnesses told us that there is a gap in the current arrangements, they believe, such that insufficient account is taken of the quantification of possible risks and possible benefits from GM technology. There is a lack of quantification of benefits and risks. People make all sorts of claims

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but there is no firm evidence on which to base conclusions at this point. Would you agree with that?

(Mr Rooker) There is not in this country at the moment because we have not been growing the crops and we have not conducted the larger trials. Until we do the farm-scale trials we will not be in a position to test the assertion that fewer pesticides and herbicides will be used.

305. How are we going to quantify the benefits and risks? How will that process be done and how are you going to deal with the philosophical differences which exist within Government and within other parties and in the population at large between those who put the risk/benefit line in a different place?

(Mr Rooker) Quantifying the benefits—I am not sure what you mean by that. Then you start to talk about the ethical side of it. Looking at the actual benefits that are alleged for these crops, the assertion is that there is less damage to the environment, fewer tractor movements, less pesticide. Those are the kinds of things we can check out and we can see whether or not those assertions are correct. If they are not we are in a position to say, “Stop. Think again. We will do it a different way.” If someone has an ethical objection to the use of biotechnology, then you have to ask yourself where does that stop? Once you go over that we will end up with a campaign saying no more biotechnology in medicines. Frankly, we are not prepared to walk away from the use of this science in that respect, providing we can control it.

306. I think perhaps I was not making myself clear. Within Government there are going to be people within the DTI saying, quite naturally, that this is a wonderful opportunity for British industry to move forward and be a leading light and therefore the risks as seen have to be weighed against those benefits which are terribly important, whereas within your particular spheres with the backgrounds that you have had, you may be more inclined to say, “This is a particular risk we have to be very careful about within the environment.” That is perfectly legitimate and it is the same with all governments. I am not making a point about this Government. All I am saying is that you will draw the benefit/risk line in a different position from some of the people in Government.

(Mr Meacher) That may be true. You raise an interesting philosophic question. You seem to be implying that Government somehow collectively should draw a line between the balance of benefit versus cost.

307. Do you not have to do that with a strategic approach?

(Mr Meacher) I would argue that that is not our role. I do not think, even if Government have the capability, that we can say that the net balance was precisely here and on that basis we are not going to proceed with this development at all. It is partly, as Jeff has said, that developments, particularly on the medical side, are exceedingly important, and I do not think anyone has any doubt that that should continue and indeed will probably be accelerated. If we are talking about the agricultural and environmental side, they are more balanced but I think the right way to

proceed is for us to put in place a regulatory system which ensures again that there is no risk to human health, no damage to the environment, and then provide the relevant information to the consumer to make his or her mind up. That is our policy and I think that that is right. I do not think it is for Government, wielding its big authority, to say no. It is for us to make sure that people are protected, given as much information and transparency as possible, and then for the public to make their own choice.

Dr Iddon

308. Could I return to a theme I was beginning to explore earlier, and that was the way that Government can or cannot influence the way that industry develops all kinds of products. You seemed to be indicating earlier, Mr Rooker, that we should not have influence on the way that GM products develop but that we should just let industry do its research and see what comes out. In fact, you have said to the Science and Technology Committee, I understand, that you do not see GM foods as necessary but it was not Government's role to stop or push them but particularly to ensure their safety for health and the environment. I put it to you that in other areas of policy Government has stopped and pushed particular policy aspects, and I am talking about energy for example, where at one stage Government was promoting nuclear energy and then it has changed its mind, and our non-fossil fuel obligations have been influenced by Government policy. Why cannot Government influence the way that industry develops in the GM technology world?

(Mr Rooker) This might be a simplistic answer but we are not going to tell people what to eat. That is the issue. The only advice the Government give people on their diet is to eat more fresh fruit and vegetables and have a balanced diet. Our job as regulators is to ensure that the food that is out there is safe and conforms to the regulations we have got for safety. In respect of our pushing a particular product or a particular process of food manufacture, that is not the Government's function. We are not qualified to do that. Therefore, what we are doing of course is funding research and we wish to stay a leading country in all aspects of modern technology. It is not the Government's job to push a particular product or process in respect of food manufacture and we are not going to go down that road.

309. But we have put a lot of Government research money into this area. Are we more interested in putting it into the crop trials or are we also putting it into the universities to develop good GM crops? For example, and this is just a pipe dream of mine, it would be very nice, would it not, to engineer crops that fix their own nitrogen, just as the clover plant does, to eliminate the use of fertilisers which are causing immense problems in our water supplies? Do you think that the Government should be promoting that kind of research against industry's research where we are getting terminator genes which cause problems in that, if this technology gets out into the Third World, Third World countries will be forced not to collect their own

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seed as they do now but to return to companies for very expensive seed? That is one of the public's concerns. Then we have the marker gene which accidentally or deliberately was chosen as an antibiotic gene and that of course has caused its own problems. I think it is the terminator gene and the antibiotic resistant gene that have given the public some concerns. That is the route industry has chosen to go down. I am putting it to you that if we influence the kind of research that is going on, we could develop biotechnology for the good rather than for the bad.

(Mr Meacher) That is our intention and the research programme is indeed directed to achieving advances along the lines that you are proposing. We are spending just under a million pounds this year. It is going to go up in the next two or three years, £1.1 million, £1.2 million a year, in addition to the farm-scale trials of £3.3 million. We are putting considerable sums of money into this and indeed ACRE itself has a sub-group on best practice in GM development. We are concerned to nudge it in that direction. What I do not think we can do is to prescribe exactly what shall or shall not be the developmental lines that shall be pursued. We certainly want to influence it as best we can.

310. I think it is important that we give that message loud and clear to the public.

(Mr Meacher) I agree.

Mr Savidge

311. The DETR's own report on the environmental impact on agriculture in July 1998 states that: "Little if anything has been done to investigate the environmental and agronomic benefits of biotechnology." It goes on to express disappointment at this. "... Government funded research provides an impartial assessment in advance of commercialisation ... In the case of GM crops, investment in this valuable research is conspicuously absent." I wonder whether both of you agree with the conclusions of the report and, if so, what you intend to do about it.

(Mr Meacher) Since it is my own Department's report I am unlikely to disagree with it, but I do think they are making a fair point. I did not write it.

Chairman

312. It does rather contradict what you just said.

(Mr Meacher) I do not, with respect, think it does. I am acknowledging that whilst I have to give cover to my own Department I also think that they are saying things which are perfectly justifiable. The fact is that ACRE itself has had a weakness. ACRE has not covered issues of farming practice, agronomy and pesticides, plant ecology,¹ farmland biodiversity. We are indeed seeking to install those particular specialisms when we come to re-appoint ACRE in June. I do accept that there has been a weakness here,

that those aspects have not been fully reflected. They are being increasingly reflected in our research programme and they will be, and indeed already are being, reflected in ACRE because ACRE have set up—I think they had the first meeting on the 15 March—a sub-group on wider biodiversity issues. We recognise that there has been under-consideration in this area and we are already trying to redress it.

313. Mr Rooker, do you want to comment?

(Mr Rooker) No. It seems a DETR exclusive issue.

Mr Baker

314. I thought you were a double act.

(Mr Meacher) We are an item.

Mr Savidge

315. Can I raise a particular concern that I know has worried the Rothschild Research Institute in my own consistency which found itself the focus, shall we say, of the furore recently. It is that the whole emphasis from the 1980s of shifting from publicly funded research to private contracts can have an adverse effect in that, whether it is coming from private companies or from environmental pressure groups, there can be at least a public perception that this may affect research. I might add that there can be the additional problem that conspiracy theories appear to abound in this area and the media tend to feed off them. It can be particularly concerning when you find it suggested that any privately funded research of any kind in any Department, possibly totally unrelated, on any subject, possibly totally unrelated, can affect the reliability of everybody working in that particular institution.

(Mr Meacher) I think that is fair comment. The Rothschild procedures which were installed perhaps a decade ago have indeed produced the results that you have indicated. The tenor of the question and the caveats in it are entirely correct. I think it is clearly wrong to suggest that all research which is sponsored or financed by industry is totally unreliable. I think it would be quite wrong to draw that conclusion. However, I think you are right, that there is a public perception which can be extremely damaging that the research conclusions may have been influenced by the biotech industry and therefore they are unreliable. However unfair and unreasonable that is, we should try to find ways wherever we can of avoiding that. It is not easy because so many of our universities and research institutes are now financed or their basic financing from Government is topped up by significant sums of money coming from industry, which is obviously valuable. It is a difficult conflict and I think we have to look at each case on its merits.

(Mr Rooker) I agree entirely with what Michael has said in respect of your comments because your comments are wholly understandable and reasonable.

Mr Baker

316. When Dr Cunningham was here on Tuesday I pressed him on the precautionary principle and his commitment to it and he assured us at that meeting that

¹ Note by Witness: In the context of impact on farming practices, plant ecology is a major part of the assessment of the risk of a GM crop in the regulatory process.

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he was fully committed to it and it had been applied throughout in the question of GM technology by this Government since 3 May 1997. He then gave us, when I asked him, an example of the use of antibiotics as marker genes and how the Government had attempted to prevent that. There are two questions which follow from that. The first is that notwithstanding that the Government's quite correct attempts to rule out antibiotics as marker genes, is it not the case that that failed because you were overruled by the European Union and therefore the precautionary principle has not worked in that particular case? Secondly, can you give me any other examples of where you have intervened directly to apply the precautionary principle?

(Mr Rooker) The example you give of course pre-dates this Government. Let us get that absolutely clear and on the record. The issue of the maize, what was the CIBA-Geigy maize, currently known as the Novartis maize because that is the technique: you change the name and it does cause a problem——

317. Like Sellafeld and Windscale?

(Mr Rooker) I could not possibly draw the analogy there. But yes, ACNFP, that is the Advisory Committee on Novel Foods and Processes, suggested some concern about that gene in the maize in its unprocessed form. It is true that when that got within the European Union it was overruled on qualified majority voting. I am unaware of the maize being fed to animals in its unprocessed form. It is obviously imported because we are not growing any here. In all the animal feed mills I have been to all the bits and pieces look highly processed. To that extent there is a problem identified but that has not occurred since 1997. We have had an issue with the recent application for cotton, which was acceptable for environmental reasons but unacceptable for feed reasons (this was an animal feed again), so both ACRE and ACNFP were involved. The British Government collectively took the view that we would oppose this in Brussels and under the voting system that was rejected. This was a couple of months ago, I believe early in March. In respect of where we have intervened, going back to the summer of June/July 1997, our intervention started in a sense in that we asked the question because there was no rule there, nothing laid down anywhere: should there be any different rules for growing these crops as opposed to their non-GM equivalent? The question was not even asked. It was not in the public domain. That led to a consultation paper. It was a modest paper but nevertheless it was very important. We explored the issue: could we take any legislative or statutory provision in this? Had we got the powers to do so? Our assessment was that we had not and it still remains our assessment. That is not to say it is ruled out for the future, by the way. I take the view that when the SCIMAC guidelines finally come out, and we have to finally agree them in Government yet, they probably will form the foundation of maybe Euro-wide legislation in forthcoming years. We have intervened in a way to take a very precautionary approach. Someone said to me, "How do you deal with the scientific advice that you get in respect of novel foods?" I had to say, "The first time I get on my desk

the requirement to approve GM-food based on the scientific advice, I will let you know because it has not happened at the present time." What we have been doing is putting in place better techniques for making sure the advice, whatever it is, for or against, is more acceptable in the public domain in the sense that we have made the committees more transparent, we have put lay members on every single scientific committee, we encourage them to network with each other, we have published the agendas, the minutes, and we are also looking at the issue—we have not finally got a mechanism yet—that applications in future for approvals will be published in advance of the committee's deliberations so that everyone can put their five penn'orth in if you like in terms of the deliberations of the committees. One final point on this question goes back to what I said originally about MISC 6 starting up. We were asked to approve a pesticide for a GM crop in advance of the crop itself being approved, but our policy is that it is not automatic that a regulated pesticide for a non-GM crop can be used on the GM version. We set that out a long time ago. You have got to go through the regulatory process again. We will not approve any pesticides for GM crops. We have to approve them for the trials, which I freely admit we are going to do,—that would make sense—but it will only be provisional approval for the trials. We will not finally approve any pesticide for a GM crop until the crop itself has gone fully through its testing and trials and has got all its full consents and then we will make the decisions regarding the pesticides.

(Mr Meacher) I would regard the precautionary principle as embedded in the Deliberate Release Directive. If there is any uncertainty about the effects of a release, then the application can be rejected or risk management measures imposed whilst further clarification and more information are obtained in order to meet a concern or a doubt. If there is any uncertainty we in the DETR would certainly err on the side of caution. In respect of the EU, again it is not a decision by any one Member State. It is a decision in which all Member States can participate. They can seek further information and they do not proceed unless they are quite sure in their own minds that they have reached a sound judgement that it is safe to do so. That is, I think, the precautionary principle built in at every stage.

318. Let us move on to the farm-scale trials, acknowledging, by the way, the efforts the Government have made to open up the process; I recognise that. When we had the Chief Scientist in the other day he told us that he had not taken a monitoring role at all with regard to the forthcoming farm-scale trials. He assured us that he was content that DETR had taken that monitoring role and was talking to the right people. Could I ask you, Mr Meacher, who was consulted upon? Who were the various parties who were talked to in order to discuss the nature and design of these trials? What agreement was reached, with whom and what factors were the more difficult ones to agree in deciding the design of the trials?

(Mr Meacher) Obviously DETR is in the lead over this matter, but of course it has been discussed, again

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exhaustively, at official and Ministerial level. Of course there is agreement around Whitehall as to the basis that we proceed on at every stage: over the selection of the research contractors, over the independent scientific steering committee which is going to oversee the results, and over the manner in which the field will be selected, the arrangements by which the trials will be carried through, the SCIMAC guidelines on which of course we have been in daily discussion with MAFF. I do not think there is any doubt that there has been full co-ordination between all relevant Departments on this matter. Indeed, there has been no conflict about it.

319. There has been consultation outside Government on that?

(Mr Meacher) Of course we have discussed with SCIMAC, with the companies that participate in that supply chain initiative on modified agricultural crops. The plant breeders and the biotech companies are all represented on that, and of course we have discussed in detail with them how it will proceed. It is our decision in the end, but of course we have actively consulted them.

320. Have you consulted environmental groups?

(Mr Meacher) Yes, we have.

321. You stated that the products in the 1999 pilot scheme will be destroyed. What about the products in the year 2000?

(Mr Meacher) It is agreed, as you say, that the produce in this year will be destroyed. We are still discussing with industry what will happen to the produce in future years when of course it is going to be on a significantly greater scale. We are talking about three or five fields this year. We are talking about 60 to 75 fields, 20 to 25 for each of the three crops, next year. I would make clear that there is no question of the production being used or sold unless all the commercial consents have been granted and the food and feed regulations are fully adhered to. That discussion is still continuing.

322. So it is possible that the produce from farm-scale trials will be used commercially?

(Mr Meacher) We have not excluded that possibility but we have certainly not agreed it. As I say, before we reach such a decision, we will need convincing that all the necessary safeguards are in place.

323. The farm-scale trials will compare GM crops with what is called conventional farming. Will there be a comparison with organic farming techniques and the results published?

(Mr Meacher) We are certainly concerned under the SCIMAC guidelines to protect organic crops and there is no reason why the comparisons should not be made with organic as well as conventional. Obviously, the overwhelming majority is conventional and it is with that that the main comparison will be made. We are certainly concerned about isolation distances, buffer zones, to protect organic crops, and there is no reason why comparisons should not, where appropriate, be made with organic produce.

324. You mentioned buffer zones. We have had evidence on that from English Nature and others. There are buffer zones built into these trials.

(Mr Meacher) Yes.

325. I am interested to know why the particular buffer zones were selected in terms of how wide they are. Can I refer you to a question which Dr Cunningham was less interested in but I hope to interest you in it, which was posed by Tam Dalyell in May 1996, when he asked the Secretary of State for Scotland about effective isolation distances for genetically modified crops. The answer from the Minister in the previous Government, referring to a particular project which had been commissioned by the Scottish Office as I understand it, said this, "Viable pollen will disperse for distances of up to 1.5 kilometres from source. This broadly supports the accepted views on pollen dispersal which are taken into account in each relevant case for the release of genetically modified crops". It seems to me that either we have got to have a situation where, because of the dispersal of pollen, we just accept that it is going to be dispersed and then there is quantification of the environmental consequences as a result of that, or alternatively you have buffer zones which are incredibly wide to prevent any damage occurring. There seems to be no logic to having an isolation distance of 200 metres other than for bureaucratic reasons almost.

(Mr Meacher) I think there are reasons for choosing 200 metres in the case of maize, and I think it is 50 metres in the case of oilseed rape, because exhaustive agricultural experiments in the past have found (and I think I quote accurately) that 99.5 per cent. of the pollen will not go further than those isolation distances. I accept of course that 0.5 per cent. on that calculation may do so, and of course, as has been recently commented on in the press, bees for example can certainly carry pollen longer distances. We do indeed have to make the decision that you have referred to. Either one has much larger isolation distances in order to have certainty that there will be no cross-contamination or we have to rest content with what, as I say, has been exhaustive agricultural practice in the past. We then have to deal with the problem of how we manage GM impurities in non-GM products. In other words, if we label it as "non-GM", does the public understand and accept that that may contain, say, up to 0.5 per cent. or one per cent. or two per cent. GM impurities? That is an issue that we have to address.

326. If part of the purpose of the farm-scale trials is to determine the environmental impact, which it clearly is, and the impact on biodiversity, if you accept that the boundaries of the farm-scale trials are insufficient to prevent possible cross-contamination, then what you are effectively saying is that we will have a trial which, if something goes wrong, is irreversible in its consequences.

(Mr Meacher) We will certainly be taking account of these isolation distances but I do believe that the research contractor, which is a very reputable body, the Institute of Terrestrial Ecology of the National Environmental Research Council, will certainly be

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taking account of the points that you are making, and will certainly, I believe, be taking them into account in the conclusions which they draw. It is being overseen by an independent scientific steering committee, again with very reputable people from research institutes and academia, who are extremely well aware of all this data and I expect, and I am sure, will be reaching conclusions and presenting them to Government which fully take into account the fact that there will be residual quantities which may exceed those distances.

327. So it is possible that consequences could follow from these trials which are irreversible?

(Mr Meacher) That is a matter on which a judgement has to be taken, as to whether irreversible consequences will follow. We are talking, as I say, about very residual quantities. The exact impacts are, and I repeat again and this has underlined everything that Jeff and I are saying this morning, unknown and uncertain. There is no reason to believe that the consequences are irreversible, but if you ask me if I can provide a statistical proof that that is so, I cannot. I do not believe that there will be irreversible consequences from the minute quantities of pollen which may exceed those distances.

(Mr Rooker) Could I add one final brief caveat to your earlier questions about the disposal of the crops from next year, notwithstanding what Michael has said, that it has still to be decided, because unless it is said the implication will be there. Those crops will not be mixed up, even if there were all their full consents, with non-GM crops in the food chain. Under the SCIMAC guidelines they will have to be separately labelled. There has also got to be a buyer for them, by the way. By definition there has to be a buyer for them. They will not simply be mixed with their non-GM equivalents.

328. In other words you will enforce the segregation of the crops which you are unable to do for crops coming into the country?

(Mr Rooker) Absolutely. There will be full segregation throughout the food chain, including labelling, exactly: something we cannot do with those crops coming into this country, which we would like to do, as you know.

Dr Iddon

329. English Nature's view is that if these controls are to be meaningful they should be carried out on a split field basis.

(Mr Meacher) Yes.

330. Is that going to happen?

(Mr Meacher) Yes.

Chairman

331. Going back to English Nature's advice, they said also in addition to a split field basis that 2003 is the likely date before you will reach any realistic conclusions from these trials. First of all, do you accept that and what is your view of that? Secondly,

if that is the case, why do you not simply announce a moratorium on commercial release until that year?

(Mr Meacher) Well, in answer to the first question, I do not think anyone can say what is the date at which a definitive judgment will be able to be taken. There can be no doubt—

332. So you are disagreeing with English Nature?

(Mr Meacher) No, no, with respect, Chairman, I am not disagreeing with English Nature. Perhaps I could just complete the answer. We believe that next year, 2000, and certainly over a two year period, including 2001, we will collect a very great deal of data, not just to look at the broad trends but indeed also the suckler trends. Indeed it is on a basis of strict comparison, a steering committee will decide on split fields but there will certainly be as close a comparative data achieved between GM and non GM as we can achieve. Now whether two years is going to be sufficient does remain to be seen. Nobody, including English Nature, can know for sure. Their view is that we may need more time. We may need more time. If the view taken is that we still, for particular reasons, cannot reach the decision that we need and a request is made for more time then we will look on that positively. The whole aim of this exercise is to be sure when we come to a judgment, which we will publish with all the evidence to back it up. This will be a wholly transparent process, and the public and many of the very committed interest groups will all be able to analyse the data, the basis on which we have reached that decision. Now maybe we can reach that in two years, maybe it will take longer. English Nature have taken the view that we may need—This is after all a four year evaluation period.

333. Right.

(Mr Meacher) We believe that the evaluation will continue into the fourth year, and it may indeed go considerably longer than that.

334. You are saying, therefore, that after, let us say, two years, before the full four years is up, which English Nature has referred to, you could agree that meaningful results have been reached and therefore the commercial needs for a particular crop could be agreed?

(Mr Meacher) That is possible. I do not think one can reach conclusions about action that we should take until you have seen the data, and the adequacy and the comprehensiveness of the data if that is possible. It may be a decision which we can take in two years, it may require significantly longer. If you say "Why do we not just impose a moratorium?" can I say, first of all that in order to impose a moratorium under international rules you have to give evidence to justify it, that means invoking the safeguard clause, Article 16 of the Directive 90/220 but our view is that it is probably not necessary and even not desirable because if you did invoke a moratorium you would halt releases altogether. The fact is we do need releases, we do need the farm scale plantings in order to discover the data which will enable us to reach the judgments that we all want to reach. So in our view a moratorium is not appropriate and a voluntary agreement with industry actually achieves the same

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purpose without these legal entanglements and without aborting the farm scale plantings which would be counter-productive.

335. You are clearly linking agreement on commercial releases of GM crops to completion of research, satisfactory research?

(Mr Meacher) I am.

336. That is the clear linkage you have got.

(Mr Meacher) Yes.

337. Dr Cunningham said to us on Tuesday that no commercial licences for exportation of GM crops have been granted since May 1997.

(Mr Rooker) Correct.

338. What is the position about licences before 1997, he was rather unclear about that?

(Mr Rooker) If there had been I suspect we would have a few thousand acres of crops growing in this country.

339. You are saying no agreement has been reached for commercial release of GM crops before 1997? No existing grants.

(Mr Rooker) You bandied the word "commercialisation" which essentially means a free-for-all, the farmer chooses and does what he wants within the normal rules.

340. I am talking about licences. No licence has been granted to your knowledge before 1997?

(Mr Rooker) There is one for the production of seed but we do not think it is used to a great extent. I have actually forgotten what the crop is now. There is one for the production of seed, the seed is not used in this country.

(Mr Meacher) Can I answer the point, Chairman, in terms of approvals for commercial growing.

341. Yes.

(Mr Meacher) There are four hurdles that have to be met, four of them. One is the safety requirements of the Directive 90/220 under part C of that Directive which includes animal feed approval; secondly, there are National Seed Listings; thirdly, the approval of novel foods—much of this is on the MAFF side—and the approval of the new use of herbicide. All of those four have to be met for any GM crop which is going to be commercially marketed. No GM application has met all four of those. The reason why there is concentration on spring sown and autumn sown oil seed rape and on maize is because they are the crops which are furthest through this process but they have not reached the end of the process yet.

342. Are there no approvals under EU regulations which mean that those plants can be commercially planted in this country?

(Mr Meacher) No, they require approval under part C and they have been granted, I think, in the case of oil seed rape and maize, under maize, yes AgrEvo maize has been approved under GMOs Safety Regulation 90/220.

(Dr Smith) It is not on the National List of Seeds though.

343. Those have been given environmental clearance but they have not gone through the full procedure?

(Mr Meacher) That is right.

(Mr Rooker) It is true to say, it is headline terms, there is no crop or food that has been approved since 1997, new, and there is no crop that has been given the full approvals for going out for farmers to do what they want with because we have not approved.

344. There are no crops in the pipeline that you cannot stop in this pipeline of approval system?

(Mr Rooker) There are dozens probably in the pipeline. There is a huge amount of stuff coming through laboratories.

345. I mean in the pipeline of the approval system. As you said there are four parts to it.

(Mr Meacher) Every single product has to meet each of these four hurdles.

346. Right.

(Mr Meacher) That will continue to be the case, that is not going to change.

347. You attach the final completion of the granting of a licence to the completion of the farm trial research?

(Mr Meacher) Yes. This is superimposed on this process. There is this process anyway but we are saying also that we are seeking agreement from industry, which we have, that they will not proceed to commercial planting until we have satisfactory results from the farm scale plantings that there is no significant or lasting damage to the environment.

348. When you say you are seeking agreement, Minister, you have not got it yet.

(Mr Rooker) Hang on a minute. The farm scale trials, by the way, are not part of the statutory process, they are part of our precautionary process.

(Mr Meacher) Yes, that is right.

349. I understand that.

(Mr Rooker) Yes but the way you are asking, you are implying that the farm scale trials are part of the regulatory system, they are not.

350. No, I am implying that you are making a commitment.

(Mr Meacher) Yes.

(Mr Rooker) Yes.

351. Not part of the statutory system but you are making a commitment that there will be no commercial release until the research is completed on the trials.¹

(Mr Rooker) Because that is what industry has agreed with Government.

352. Yes, industry has agreed that?

(Mr Rooker) Yes.

Mr Baker

353. Can I ask what the position is on the non statutory seed listing arrangement subject to the recent court case? Am I allowed to ask about court cases, everybody has gone quiet.

¹ Note by Witness: Unrestricted commercial release will only take place if the farm scale evaluations show that there are not adverse environmental effects.

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[Mr Baker Cont]*(Mr Rooker)* Which recent court case?

354. Which was instigated by Friends of the Earth and three Members of Parliament about the approval of seeds on a non statutory basis.

(Mr Rooker) When you say recent, you mean in recent weeks?

355. Yes?

(Mr Rooker) No, I am not at liberty to talk. That is something which is being discussed with the lawyers at the present time and I would be misleading you because I am not briefed on that. I am not briefed on the up to date situation. I thought you were referring to last year's court case.

356. Not the organic farmer, the most recent one.

(Mr Rooker) The most recent one. No, I am not in a position to answer. If there is any information I can let the Committee have we will clearly do so. This is a matter for discussions with the lawyers because the matter is before the courts at the present time. I am not clear where it is in the chain, as it were, before the court.

357. Just to follow up the Chairman's point, to be absolutely clear, will commercial planting be allowed to take place under any circumstances before the farm scale trials have been fully and successfully completed?

(Mr Rooker) No, because the industry has said they will not seek to do that.

358. They could change their minds theoretically?

(Mr Rooker) Yes, they could theoretically but we have every reason to believe they will not do that.

Mr Savidge

359. Friends of the Earth have supplied this Committee and the Government with a legal opinion which they obtained on the scope for unilateral UK action.

(Mr Rooker) Yes.

360. In terms of both EC legislation and GATT and related agreements, I wondered if you have supplied them with a substantive response?

(Mr Meacher) I have partly responded to that by saying that even if we are able to take unilateral action we do not think that is the best way forward, for the reasons that I have given. If we were to impose a ban or a moratorium which actually brought a halt to the release of GM products, if it caused the farm scale trials to be brought to a grinding halt, that is really I think cutting off our nose to spite our face, I do not think that would be a very effective way of operating. We want to collect this data, we want to continue with these releases under a strictly controlled, regulated and limited basis for which we can get all the conclusions that we want. That is a much better way to proceed. If, on the other hand, there is evidence in the course of any of these trials that there is a risk to health or particularly that there is a risk to the environment then of course we can call a halt or we could change the risk management regime in order to minimise it, we could have a more thorough environmental impact appraisal. Obviously we are looking at the information

as it is available to us as we go along. Just to impose a blanket ban or moratorium would not be sensible at this point I think.

361. Can I take it, following Mr Meacher's reply, Mr Rooker, that you would not feel there would be a basis for changing the previous evidence you gave to this Committee that we are in no position to insist on a moratorium on planting of these crops? How would you respond to the fact that France and Austria are reported to be introducing a moratorium and to what extent really would you say that reluctance to impose a moratorium is not so much driven by the demands of international trade agreements as by a belief that any restraint should be research based rather than time based?

(Mr Rooker) I do not know what will happen so far as France and Austria are concerned. Both of them are, if you like, up before the European Commission because they have to be able to justify what they are doing. It is the case, we are 15 Member States, we are working in a single market with a regulatory system. It may be—it may be—in some states the nature of their environment, their geography and everything else dictates the fact that they say "This is not suitable here" because of these reasons. Now that to me is a wholly acceptable way for them to operate and they have to be able to justify that. If you cannot justify it and you have not got a good reason then you will fall foul of the international obligations and that does not do anybody any good. We would be operating Government on the basis of a hunch, we would be operating Government on the basis of a whim, if you like, of Ministers. The idea of this House is to stop that kind of nonsense. You have to have a good reason for the basis of Government decisions, you have to be prepared to explain it. The unanswered question you did not ask so I will answer it now is no I am not prepared to disclose the legal advice that I have had.

362. Can you confirm that the Government will not allow a commercial release of GM crops until such time as you are adequately satisfied that the impacts on biodiversity from farm practice will not intensify the pressure on UK wildlife? This is one of the cases where the precautionary principle we have talked about is applied.

(Mr Meacher) Basically yes. You are asking a question which I think I have exhaustively answered already and that is indeed our position. We wish to increase the conditions for farmland biodiversity to be enhanced and certainly we are not going to allow commercial planting which exacerbates that process.

Chairman

363. Do you not see though, Minister, there is a need to reassure the public about these matters——

(Mr Meacher) Yes.

364. — both as regards food safety aspects, which we are not considering today, but also the biodiversity and wildlife aspects. While you persist in saying a moratorium is of no value, the public demands will not be reassured that you are taking this as seriously as you should be.

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(Mr Meacher) Well, I cannot predict what the response of public opinion will be. All that I can do is to give the arguments and what I think are the convincing grounds to justify the Government's position. In effect we have achieved the same purpose as a moratorium by getting agreement from industry that there will be no commercial plantings until we are satisfied about the environmental effects. That is exactly what a moratorium will achieve. What we have avoided is legal entanglements and issues about whether or not one can take unilateral action. The other point which I am making, a very important point, a moratorium might actually call a premature halt to releases of GM which we need in order to get the data from the farm scale plantings. I hope the public opinion will perhaps accord to the Government a little subtlety in this that we have achieved what they want but in a manner which also secures the wider objective that they and we also want.

365. Do you think that subtlety is going to win the presentational battle?

(Mr Meacher) I think given, as someone said, the gene smog which exists that needs some megaphone diplomacy you are probably right, Chairman, but I do think *simpliste* answers are to be resisted unless the ground rules for them are right.

366. I fully accept what you say about *simpliste* answers but nonetheless there is acute public disquiet.

(Mr Meacher) Yes.

367. As fuelled by the media. You have to respond to this aspect of the matter. As we know from previous history, BSE, etc., it is a very important fact which has to be taken into account. Are you satisfied the way you are going about it is fully taking into account legitimate public concerns?

(Mr Meacher) All I can say is I hope so. I think we are trying to be extremely sensitive to public opinion. We are listening very carefully to what they are saying. I have had endless discussions with a whole range of representative opinions and we are really listening. I hope that has got across. I think it is very important that we take public opinion with us. But, if I may say, Chairman, the fact that this elevated Committee is cross-examining the relevant Minister and will be issuing its report is one of the ways, I hope, by which we will communicate to public opinion what we are doing and why.

(Mr Rooker) Can I say I think your analogy with BSE is a bit unfortunate because the way this policy has been conducted in a way that is open and transparent, I know it needs constantly repeating, there is no hole in the corner attitude here. Michael is required to publish the map references and everything else where the trials are. There is nothing behind closed doors. There is far less behind closed doors on GMs than there ever has been on the issues relating to BSE and of course the other difference is, and it has to be said, with BSE people have died, they are dying and more, regretfully, are going to die. We have not got a shred of evidence that genetic modification of food has caused any harm to humans, contrary to the assertions that are made with the accident in America where it is part of folklore now because it is in the

cuttings, repeated in this House unfortunately, headlined the following day. There is no evidence that the issue there, the sad deaths of those 37 people had got anything to do with genetic modification but everything to do with lack of following the rules about the filtration process. The analogy is not there. The only analogy between the two, I would imagine, is the fact that the Government or the taxpayer through the Government is spending enormous sums of money researching both issues.

Mrs Brinton

368. Perhaps I could take us off the issue of food now and back on to environmental regulations. Certainly during this inquiry our evidence has really tended to lead towards the fact that the current system's main difficulty has been in managing to assess the cumulative and indirect impacts of the GM crops on wider environmental issues. I stress environmental issues here and not food issues. Now I am aware that the EC Directive 90/220 is going to be revised and do you think it is going to go far enough in correcting what we perceive to be a fault line here?

(Mr Meacher) That is a good point because the scope of the existing 90/220 Directive on this point is not very clear. It is proposed that the revision should make explicit that environmental risk assessment should take account of indirect as well as direct effect and cumulative effective. In other words, if a commercial consent has already been given for a GM herbicide tolerant crop and another is added we need to look at possible inter-linkage between the two. That is a factor which should be taken account of in the risk assessment. We are strongly supporting this. It is being made explicit in the Directive. It is already explicit in the instructions that we give to ACRE that we want to see them looking at indirect as well as direct impacts. I made that clear a few months ago and they are already doing it.

369. Thank you for that. I was very encouraged to hear earlier that ACRE is going to have an extension of the remit. I think you have both detailed the additions to that. Do you think it is going to be sufficient in modified form or extended form in looking at these concerns? More interestingly, is ACRE going to look back on previous decisions and revise them?

(Mr Meacher) There is no proposal that they should revisit previous decisions and indeed to my knowledge there are no grounds on which that is necessary. If grounds were brought forward for us to believe that earlier decisions made were inadequate or improper, I very much doubt that but if that evidence was brought forward, then I think obviously we would take account of it. I hope the extension of the remit to indirect, long term and cumulative effects, bringing on the new specialisms of farmland biodiversity, agronomy, farming practice means that we now will have the whole range of key specialisms included on ACRE as well as obviously the core disciplines of molecular biology and genetics. We believe we have got it right but in this case one continually reviews one own's actions and if we need to review it again we will do so.

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[Mrs Brinton Cont]

370. ACRE is clearly going to have its hands full and presumably the outgoing Chairman has had the detailed heroic workload that ACRE in its previous incarnation had. How are you going to resource it? What is the level of resource that is going to be needed to cope with the future heroic work?

(Mr Meacher) I am aware that ACRE like other Government bodies always believes that it needs more money and obviously that is a matter which we discuss or my officials in particular, and Dr Smith on my left particularly, will be discussing with them. We believe that they are adequately resourced. As I say the research programme is being significantly increased. There is a very close working relationship between the scientifically qualified personnel under Dr Smith with ACRE. They provide the secretariat. They will clarify any further evidence which ACRE needs but I have to say again that is an area where improving the clarity about the scope and application of the 90/220 Directive is going, I hope, to mean in future that there is less need for lengthy and delaying episodes of collecting further information. It should make it more efficient, it should also make it quicker and that will also help ACRE.

371. Just returning to the Directive, I am pleased that you have raised it, do the proposals for the new revision actually allow a Member State of the Community subsidiarity in deciding on applications in the light of obviously what are going to be very varied ecological circumstances and differing agricultural practices? Indeed, will they be allowed to take appropriate and sensible action if necessary? Just concluding these remarks, I feel obliged to say that it might be a single market but it is certainly not a single environment.

(Mr Meacher) That is a fine *bon mot*! It has always been the case that subsidiarity exists in the sense that in each Member State, as I have said, its own competent authority examines the evidence, makes its own risk assessment, can ask for further information and can certainly object and disagree. If there is disagreement between the competent authorities they will discuss it in the context of the EU regulatory scientific committee. There is very full examination of the particular different circumstances which may exist in different Member States. Certainly we wish that to continue.

Dr Iddon

372. In a report on Environmental Standards the Royal Commission on Environmental Pollution said and I quote: "No satisfactory way has been devised of measuring risk to the natural environment, even in principle, let alone defining what scale of risk should be regarded as tolerable." Do you accept that analysis? Do you agree that if it is true this presents ACRE with an enormous task?

(Mr Meacher) It is very important that there should be agreement about what we mean by a rigorous environmental risk assessment. One of the problems, in fact I would say the main problem, with the existing 90/220 European Directive is that nowhere does it say conceptually or in practical terms what

exactly constitutes a proper environmental risk assessment. That is being corrected in the revised Directive. There is an annex which sets out the criteria by which a rigorous environmental risk assessment should be carried through. We think it is absolutely essential that every application is subjected to standardised and agreed criteria so that there is a thorough appraisal and that it is the same for all Member States. Of course, as I say, it should avoid further delays through needing to collect further information. I do believe in this country the quality of environmental risk assessment already undertaken is of a high order and I think it is ensuring that those same high standards prevail across Europe, which is the main requirement now.

373. The present guidance on risk assessment concentrates more on what questions should be asked rather than on how to interpret the answers to those questions. Will this common approach that you referred to that is being developed across the EU give guidance on what should really be considered as harm?

(Mr Meacher) I am trying to think about my memory of the annex of the revised Directive and what exactly is the definition of harm in it. I do not know whether Dr Smith can refresh my memory on that, if not we will certainly come back to you with a written answer which sets out exactly how far harm is set. The problem of assessing what is harm is of course a very fundamental question and one which is quite difficult to answer. I am satisfied that the environmental risk assessment undertaken by ACRE does adequately encompass the full range of what we would mean by harm to the environment now that we are also looking at indirect, long term and cumulative effects. I think that was a gap but we have now addressed it and I have no reason to doubt that harm is properly assessed in this country.

Mr Savidge

374. We had understood that membership of ACRE for direct employees of relevant private companies and direct employees of relevant environmental organisations was to be ruled out in future but Dr Cunningham in evidence to us earlier this week seemed to suggest that he did not think there was any reason either under Nolan rules or Government policy for such people to be ruled out. Can you perhaps clarify the situation?

(Mr Meacher) Yes, certainly. There are no rules by which the Government operates at the moment which say that a person employed by industry shall not be a member of a particular committee, there are no such rules. The judgment that I was required to make was in the rather unusual circumstances that now exist, namely the last Government appointed the current membership of ACRE on 17 June 1996, therefore their three year term comes up within two months' time and under the Nolan rule ten out of the 13 would be expected to stand down. I think it is important to make the point that only two members of ACRE and I think none of CNFP are currently directly employed by industry. Let me make it quite clear that I do not have any reason, any grounds for complaint about the

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[Continued]

[Mr Savidge Cont]

quality of work, about the standards, about the integrity of those two members. This is in no way a suggestion that they have carried out their tasks improperly. What I have to take account of, however, and this just applies to ACRE, for which I am responsible, I am not making a general rule, I have to take account of ACRE on which enormous public spotlight has been concentrated over the last few months and if we are going to restore public confidence in their work, my belief is that there is no reason why there should not be public confidence but a lot of aspersions have been cast, it is very important to avoid giving grounds for that perception that the link with industry might in any way prejudice or undermine the quality of the advice. I do not believe that has happened but I am very anxious to avoid that impression conceivably being given in future. For those reasons I would judge, and it is a judgment I am making, that it would be better if the reappointed ACRE did not include persons directly employed by industry. My view is that industry has a very real role to play in this but not at the regulatory scientific level but in the stakeholder forum, perhaps at a strategic level, what the Chairman was talking about earlier.

Dr Iddon

375. Do you agree on those scientific advisory committees it is very important to have a Norman Baker, someone who can probe the consciences of the scientists before they give their advice?

(Mr Meacher) There may well be a case for an environmental or consumer representative but not, I hope, Norman Baker. That is meant to be a joke, as I am sure you realise. I think there is a difference of view. I think Jeff and I have already made clear that we take a slightly different view here. I do understand his view, I hope he understands mine. My view is that this is a strictly scientific committee in which there is a high level of scientific rigour and a quality of scientific analysis which is not immediately comprehensible by a non scientist. Now I do know the argument that, as they say, someone asking the idiot question, somebody who is networking whether the committees can force such an august and perhaps academic body sometimes to face up to the implications of what they are proposing. My view is that that role is properly played at a different level at the stakeholder forum rather than in the scientific committee.

Chairman

376. In your decision—to follow that up briefly—on ACRE, you equated direct employees of environmental groups with direct employees of companies involved.

(Mr Meacher) Yes.

377. Yet of course direct employees of environmental groups do not stand to gain financially or personally from the advice they give. I wonder why therefore you are going to exclude them on the same basis? Is it just a tit for tat?

(Mr Meacher) For a different reason. Persons directly employed by industry, I would propose they

should not be included this time round for the reason of public perceptions about the influence on their judgments. In respect of the environmental group, as I have just indicated in answer to Dr Iddon, my view is that there is very much a role for such a person but that should be at a different point within the regulatory structure, at an advisory committee or strategic level involving other stakeholders.

Mr Savidge

378. Moving on now to public confidence and public concern, to what extent do you feel that the current obsession, one might say, in the UK press with the issue of genetic modification is based on legitimate public concerns and to what extent do you think it is a case of media overkill?

(Mr Meacher) There are unquestionably legitimate concerns. We have made abundantly and honestly clear that there is a great deal that is not known about this fast developing technology. Until we do have convincing and comprehensive answers it is quite right that people should have concerns. We believe that Government is adequately and properly reflecting those. At the same time one does have to have balance in judgment and all that I can say, I am not going to comment in detail on the press, there are occasionally presentations in the press which seem to me to be very wide of the mark in terms of securing a proper and fair balance.

379. I think I might be inclined, again given my constituency interest in the Rowett Institute to concur with you on that. My impression is that Dr Pusztai, an eminent scientist in his own specialisation, was commenting on areas outwith that specialisation and did not appear to have experimental data to support his conclusions. An independent audit committee set up to look at that seemed to find lack of evidence, I think in certain cases there seemed to be a lack of experiment altogether. It is my understanding again that you, Mr Rooker, have arranged that particular assessment is now to be looked at by an expert committee of the Royal Society's and that in all those circumstances it might seem that some recent press coverage has been somewhat overdone. I wonder if you would like to comment on that?

(Mr Rooker) Can I just take it in the round because Michael is quite right that we do disagree on the issue of lay persons on scientific committees. I am strongly of the opinion that there should be, which is why we have taken steps to make sure on all the scientific committees that serve MAFF, including SEAC, we have got lay people on. In due course Michael's proposals will come probably to MISC 6 for ACRE and the Government will take a view on this issue.

Chairman

380. You are not about to do that today.

(Mr Rooker) I am not prepared to do that today because obviously we have an announcement to make about the regulatory overview because quite clearly there will be some changes, having looked at the regulatory system we have inherited. On your issue of

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the press, no complaints whatsoever about the freedom of the press to write what they like but I do complain if they expect us to construct policy on the basis of their headlines and that is the root cause of the issue. The public are of the same ilk, if you like, in fact a hunch or indeed a political objective of people outside Government who, let us say, have a political objective to say the UK is going to be a GM free zone and that is our objective. Now I cannot really have a debate on that basis because I am being fed with evidence and I have to make the decisions on the basis of some evidence and not a hunch. Therefore, it can be difficult in those circumstances. I make no complaint about people having that as an aim by the way but it is not necessary that we have to jump and then create Government policy on that basis. So far as Dr Pusztai is concerned, I am reluctant to say too much, Chairman, because the Royal Society is due to deliver up a view, I understand next month, ie. May, I do not know the date. I thought I dealt with Dr Pusztai last August just after the House had gone into summer recess when the issue came out and then subsequently we discovered the potatoes had not been genetically modified. Nevertheless the research has still not been published and until the research is published no other group of scientists can go anywhere in the world and say: "Well we will repeat this and see if it is true" or see what happens and what kinds of allegations will be made. In the climate that was created in the early part of this year, it was like a wonderful add on for journalists to claim: "Here is a scientist who had something to say, the Government gagged him. He has been sacked. Cover up" and all of that was untrue. Untrue. Once it is out and running the Government is placed in a position to have to react. We had no view on Dr Pusztai because he had not published his research. We had nothing to assess. There was no application for genetically modified potatoes and the argument that would have been used or one of my lines last summer was "Well this shows that if anyone had applied for GM potatoes it would not have got through the regulatory system because of A, B and C or what he was saying". We do need proper scientific research and evidence. That is not to dismiss in any way public concern. The public have a right to be concerned in an alert democracy, to question what the scientists are doing, after all they are paying for a lot of it with their taxes as well and what they provide as customers and they have every right to challenge Government, to challenge Ministers: "What are you doing, why are you doing it? Are you checking? Are you asking as Ministers the question". I am an engineer, I have forgotten what Michael was, it is so long since we came into this House, an academic probably. It is our job to analyse and use the advice that is put to us in a common sense way and then be accountable to the House, of course, and the wider public for the decisions we make. I think if it was ever thought that we were making decisions on the regulatory approval system or on the basis of policy in this respect on our own personal hunches or on the basis of unqualified opinion or unpublished research, you might get away with it once to get a good headline but you would be in real trouble afterwards. The Government would be

wholly discredited and so would the structure it got of making sure we try to control and use science for the public good in this country. Therefore, we just have to take a robust stance and our great defence is the fact though we have changed the culture since May 1997 we have been open and transparent. It causes more problems for us simply because we are giving out more information and therefore there are more queries, there is more pressure. I consider that to be a positive part, if you like, of the process of transparency and the process of opening up Government.

Mr Savidge

381. If I can just pick up on two points you have given in that answer. You talk about first of all getting the climate that is created, you also talk about changing the culture since 1997. How far do you feel that part of the problem has been that the public has lost confidence in the way in which Government responds to scientific advice possibly directly as a result, as the Chairman has already indicated, of the whole situation with BSE and that has influenced the whole discussion of GM technology?

(Mr Rooker) It has. It is not just BSE, it is going back to listeria, salmonella, E.coli. I walked into MAFF almost two years ago, I had no idea, for example, there were the best part of 300 people in Ergon House, MAFF's food defence police, if you like, dealing with issues of labelling, contamination, adulteration, additives, policing of the system at that level, nobody ever talked about it. All I ever heard talked about were the disasters as a Member of this House. Likewise there is a similar but smaller team in the Department of Health, they have essentially been put together as the Joint Food Standards and Safety Group. There was never a fair balanced view. There were problems. BSE is a major problem, both to the previous Government and ourselves in dealing with the legacy in a sensible way. It is a very costly problem in respect of public expenditure and of course to human life. That has coloured the public's view. Now it is an easy answer for me but it is not a cheap one to say the Food Standards Agency is our response to that, in other words to dislocate from the Ministry of Agriculture the issue of food safety so that it is placed at arms length from day to day decision making by Ministers and then to answer to Parliament through Health Ministers. So that the Ministry of Agriculture simply becomes the sponsor of the food industry, which it will remain, and of course agriculture. The public are getting a view therefore from Ministers and an Agency that are not seen to be riding two horses. There is a paradox there. Obviously until that is up and running the real perception will remain but as I pointed out earlier on since September 1997 MAFF has not unilaterally had the authority, and neither have I, over food safety issues. All the decisions are taken jointly between myself and Tessa Jowell and if we do not agree they are not taken, it goes to a different level. We have tried to meet this concern that you have rightly identified.

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[Continued

Mr Baker

382. One more thing on the media really, you have given the media a bad press, if I can put it in those terms.

(Mr Rooker) Yes but I have been honest. I think I have put an honest view.

383. Okay. I am just summing up what you said in a way. Would you not accept that the Government in itself has contributed to some degree to the opportunity for the press to create headlines which you may regard as sensational because there has been a genuine philosophical difference across Government and therefore there has not been a clear unified voice within Government Departments as to where you are going on the whole issue and that has partly been a contributory factor. In the week of Dr Pusztai, the controversy arising from that, I am not talking about that issue particularly but in that particular week, the Government started off by having the Prime Minister saying that genetic modification is the potential to enable us to produce food that is better tasting that was his answer to me. We had Dr Cunningham saying it was a great industry in this country and that went down very badly. At the end of the week you yourself and Mr Meacher were making the Government's case and calming things down and you were putting a rather different emphasis on matters from the Prime Minister and Dr Cunningham. So although the media may have had one or two scaremongering headlines I would suggest that the contributory factor has been that the Government has been taking different views philosophically across Departments.

(Mr Rooker) I will answer that first and then finish what I was also saying. In some ways I disagree with that. If I go over chapter and verse, I counted up for one week, I did 21 interviews. We are dealing with the detailed issues, Michael and I and at Tessa Jowell's level. It became clear that the mixing up of concerns over food safety with threats to the environment had to be untangled because it is in the interests of people who are campaigning for non growing of the crops because there are threats on the environment to, if you like, beef up the food safety scares which are easy to do because of the climate. It is fertile for that in this country at the present time. Disentangling those seemed to me to be crucial. There was no division in Government. I accept that as a result of the media blast, if you like, with 80 pages of press cuttings every day on my desk, literally that was the situation, some true, some untrue, some appearing to be quite far fetched, the Government cannot stand back if you have this kind of operation going on causing concern amongst the public, from our point of view wholly unnecessarily because it became a shock to people, even Members of this House to learn that no new GM foods had even been approved since 1997, that all the ones that had been approved, of which there were very few, were prior to that and had gone through a regulatory process, to know that the country was not full of GM crops. These issues are difficult to disentangle. It is complicated but I can say at the moment we have got to the position now where, how can I put it, the Government is seeking to speak with one voice hence our appearance here together today

and I hope that has been helpful to the Committee but I cannot issue a press release on genetic modification unless it is cleared around the MISC 6 group and likewise for Michael, for all of us. The co-ordination has been approved substantially.

(Mr Meacher) Can I say I do not actually believe that attitudes within Government are the cause of this enormous attention, this frenetic attention which has been given to this issue. We make our own judgments. My judgment is that Government have not contributed to that in the way you have said.

Chairman

384. You did say at the beginning of our session there have been two extreme views, to quote you, struggling inside Government.

(Mr Meacher) No, no, no, I did not say inside Government, that is certainly not the case. There may be nuances. No, no, no I was referring to the views of those who say that this is the greatest thing since sliced bread if I can use that particular rather inept example. This is a fantastic technology which is going to serve us better than anything in the 21st century and those who think this should be banned immediately, has no benefits and is a disaster. Between those is where I think Government is. We need to be extraordinarily careful about this. The point I am making to Mr Baker, I think, is that it is BSE that has created the problem. If you are talking about the food that people eat, after what has happened over BSE, they are extraordinarily sensitive to it, and that is the real issue. I do not think Government is at the back of this at all.

Mr Baker

385. I accept that but the point I was making really was that in my view, having the responsibility for these issues within my party, and with the exception of you two, who are here today, there was a noticeable lack of knowledge or any presentational ability at all on the whole issue outside of the two Ministers who are sat here today. That was the problem. When the Prime Minister was asked the question he did not know what he was talking about, quite frankly, that was the problem on that particular occasion. That may have been sorted out but the knowledge which I think the Ministers here have was not replicated elsewhere in the Government when the crisis blew up. That was the point I was making.

(Mr Rooker) I think it was unfair of you then at some time in the past, I have not got the date but I have got your own press release here, to describe us two as part of the cautious team against the Prime Minister and Jack Cunningham for the care free team.

386. That is right.

(Mr Rooker) That is very, very unfair and inaccurate, if I might say.

Chairman: If I may say it is entirely accurate, as a matter of fact, we are asking the questions here. Even though he is from a different party I rather support him on that.

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Mr Baker

387. Lastly on the media, this is an article from *The Daily Telegraph* "Meacher to purge GM crops advisors after public unease". I just want to put this one to bed because we were told by Dr Cunningham on Tuesday that the reason why ACRE was having its membership changed was simply because of the Nolan rules coming forward and that was a natural consequence. You sort of repeated that yourself but you were quoted in this article as saying "The balance of opinion on the Committee is pretty strongly in favour ..." that is of industry "... and it needs to be rebalanced". Now I am just checking, to be absolutely clear, what the motivation was or the reason was for the change of membership? Was it simply the Nolan rules and is this article therefore inaccurate?

(*Mr Meacher*) The reason as I have indicated for the changes that I am proposing for the ACRE Committee are wholly and fully that these ten members are required under the Nolan procedures to stand down. We therefore have to look for ten new members, including the Chairman. That is the reason why the change is taking place. Secondly, can I make the point that I did not use the word purge, I would never use the word purge, it is quite inappropriate. This is not a purge of a Committee, this is a change which is brought about by public principles which we all strongly support. It is no reflection at all on the quality or performance of the existing membership.

388. Right.

(*Mr Meacher*) I really do want to make that quite clear. I did make that quite clear in the preparation before that announcement and I would wish that the balance that I introduced in my remarks should be fully reflected.

389. I have given you the opportunity to do that.

(*Mr Meacher*) You have.

390. Of course I accept absolutely your version. You are of course arguing that *The Daily Telegraph's* sub editors are less than straight with your comments, which is a very serious allegation of course. Let me move on to labelling. Can I ask you Mr Rooker, have you completely ruled out the idea of "labelling for process", that is to say, extending the labelling review to recognise GM material at an early stage?

(*Mr Rooker*) I have not ruled out the idea of further action on labelling, that is for sure. The labelling situation as far as foods are concerned, as you know was a legal requirement, the ingredients in the foods was a legal requirement from September 1 last year. We consulted twice on the regulations for that. It was last August that the Government took the decision, which we were entitled to do under the European rules that were coming through to include the catering industry. Now not a shred of comment about that at the time. So when we consulted about this because we wanted to be as wide as possible, to make sure the labelling was accurate, we consulted on that, some issues were raised, both by caterers and food manufacturers. We went out for another mini consultation in February that resulted in the regulations coming into force on 19 March for food ingredients and 19 September for catering for the ingredients. The

issues that arise, the European Union has still to come through with its proposals for additives and flavourings which I fully admit is—a loophole is too strong a word but the fact is it is not complete the labelling issue, additives and flavourings have certainly got to be covered. There has got to be a de minimis level, I think, as Michael indicated this morning, regarding the crops, as to whether or not there is accidental or storage or carry over from non GM crops. Then there comes the issue of the process. Now I am keen to have whatever is put on the label checkable. I think it is wholly wrong that food manufacturers, retailers would be able to make a claim on a label that the policing of the system could not go and check. Now on the derivatives, the review of the refined oils in particular, let us say, if the argument is going to be on there that no GM ingredients are used in the process or no GM technology is used in the process of this product then those who check and police the system, which essentially are the Environmental Health Officers up and down the country, cannot take the product to a laboratory and say: "Can you say whether the claim on that label is false or true", it is not possible to do that. That does not mean to say that I am not aware of let us say the concerns, the need for the public to know more. We are having to look—it is early days at the moment—to see whether or not you can turn it on its head and look at it the other way round. If someone wants to make a claim that during the processing of this food, the manufacture of it, no GM technology is being used and they are able to provide information on the traceability through the process that would be checkable then you may be at the beginnings of something that you can have that is realistic for the public to give them comfort, that is what they wish. That is early days. So I do not rule it out but doing it in the more simple way that I was asked to do earlier on, it is impractical because you cannot police the claim and the minute we let manufacturers get through with claims on labels that cannot be policed, we have opened a precedent for other issues, and that is what I am trying to avoid.

391. I am grateful for that useful steer and I know you are very committed to labelling personally. The point I really wanted to make was that people wanted labelling of GM foods, not necessarily for food safety reasons, though they may do that, but they may want it for environmental reasons, because they may be concerned about the environmental consequences and want to say, "I do not want a product that is damaging the environment". That might be the motivation and that is why the process is important?

(*Mr Rooker*) Absolutely. Look, we introduced the beef labelling scheme on a voluntary basis, which will become compulsory. Under that it is possible actually to have on the label the method of slaughter of the animal. In no way is that a food safety issue but it might be of concern to people to know whether it was slaughtered in a particular way or not. Therefore, I wholly agree that you need to ensure that what is on the label can be policed and be checkable, otherwise we are conning the public, to be honest, and that is what I do not want to be in the position of doing.

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[Mr Baker Cont]

392. May I turn to the issue of liability, which is a question that I raised with English Nature and, indeed, with Sir Robert May and through questions with you, Mr Rooker. There is, certainly in my mind unless you can put me straight, a lack of clarity as to who is responsible—perhaps I should be asking Mr Meacher—for environmental damage which is caused theoretically as a consequence of GM cultivation? Is it the people who produce the seeds, the crops? Is it the farmers themselves who plant it? Is it the Government which has introduced the regulations which may have been seen to be, in some theoretical cases, insufficient? This is a point raised with me by my farmers, I might say, in my constituency, who are very concerned that, like BSE—this is usually the comparison they are making—they may be left standing in the middle when the music stops, as they were on that particular occasion. So what steps is the Government taking to establish liability for anything that is wrong in environmental terms with GM cultivation?

(Mr Meacher) That is a very good question and there is unquestionably a good deal of uncertainty, to which we are applying ourselves at the present time. The position is that liability is currently governed by general civil liability rules in the United Kingdom, including the common law of tort as it has been developed by the courts, and we do accept that a statutory regime for product liability may also be relevant here. I have to say that whilst I am sure there is concern amongst farmers and others, we are not aware at the moment of any civil liability cases on GMOs which have been brought so far, but I entirely accept that may well happen. The European Parliament has called for the establishment of a liability regime to cover the release and marketing of GMOs. That is now being considered by the Commission. My understanding is that the Commission does intend to bring forward a comprehensive White Paper on environmental liability which may cover damage caused by GMOs. The problem with that is that it is a White Paper, it has not been produced, and before we get legislation there may be several years elapsing and this is a fast-moving development field. So we are looking very carefully at how best to remedy the various kinds of damage on a consistent basis. We have not yet reached a decision on this but I accept it is a very important issue.

393. Will it be sorted out before commercial planting is allowed?

(Mr Meacher) We are proceeding with the farm-scale plantings. I certainly believe that we are not going to move to commercial planting for some considerable period of time and I certainly expect that we shall reach a view on liability well before that.

Mr Savidge

394. Would it be desirable to build liability into the actual Directive negotiations?

(Mr Meacher) If you are talking about the Biosafety Protocol, which was discussed but finally the negotiations failed, as I said, at Cartagena in February, I did think liability is a serious issue there. I have to say that the negotiations broke down for different

reasons, namely, disagreement about the application of advance informed agreement procedures to commodities for food, feed and processing, on labelling and marketing and on the so-called savings clause, namely, whether the Biosafety Protocol is subordinate to WTO or parallel with it. Liability was an issue which was discussed in those negotiations and I think there was agreement that at some stage in the future at a conference of the parties the matter would be raised again, and it does need to be resolved.

Chairman

395. Referring to the Biosafety Protocol, which, as you say, failed at Cartagena, as you may know, the European Parliament has called for the introduction of the principle of advance informed agreement into European regulations and into Directives. Does the British Government support that?

(Mr Meacher) Yes, we are in support of the principle of advance informed agreement, certainly in the case of commercial plantings, and, indeed, I believe the Miami Group also supports that. The disagreement arises because the Miami Group, which represents, I think, six countries, of which one, the United States, is not even a member because it is not a signatory to the Convention on Biological Diversity—the six member states of that group, the Miami Group, refused to accept the application of AIA principles to ingredients for food, feedstuffs and processing. It is the EU's position, which we held to, trying to act as a bridge between G77 and the Miami Group, and we had G77 working with us in partnership, so it was the rest of the world who agreed that AIA should apply to the first trans-boundary movement, so that there is an opportunity for states to make an assessment about their agreement to accept a GM ingredient and that thereafter the documentation would be sufficient for them to know whether they were receiving the same GM ingredient which is already covered by the consent that they have already given. That is our position; that remains our position, but it is a position which is not agreed in particular by the United States.¹

396. Would that put European companies at a competitive disadvantage in the absence of any multilateral agreement?

(Mr Meacher) There are two issues here. One is where we are talking about United States exports to the European Union and we would then be an importing country who would have the right to the exercise of AIA for the first trans-boundary movement of GM ingredients, or we could be talking about exports either from the United States or from the European Union to third countries, particularly developing countries.

397. Where it would place the European countries at a disadvantage if they had an agreement and the rest of the world did not?

¹ Note by Witness: In the final stages of the negotiations at Cartagena, Columbia, the EU tabled a compromise package which included a position enabling the parties to address the issue of commodities at their first meeting. This was put forward in an effort to bring together the parties to the negotiations. It received support from all but the Miami group.

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(*Mr Meacher*) If we are envisaging a situation in which the European Union proposals prevail, namely, that AIA is in place in regard to the first trans-boundary movement of GM ingredients, if that were internationally agreed—and the fact is it is not—we are talking about a hypothetical situation and I have no reason to doubt that the Americans are not going to agree that. I do not at this moment see how they have a way forward, but whichever way forward, I do not think the European Union will be at a disadvantage if it is a level playing-field.

398. On the third world, finally, the Chief Scientific Adviser to the Government said that hitherto the problems of feeding the world's population have been largely problems of distribution but that with population growth it would actually become a question of more mouths to feed, and he thought that biotechnology could make a contribution to a second "green revolution", if you like, which will be necessary to feed the world's enhanced population. Is this something which Government analysis supports? Is this something you agree with?

(*Mr Meacher*) If I may start on that, and Jeff may very well want to comment, my own view is that biotechnology has, it is plain, particular advantages in terms of the ability to grow in more saline environments or in drier environments or longer-lasting produce. Those are clearly advantageous and it is, if you like, another stage of the "green revolution". My own view is that whilst that can be helpful, and I certainly welcome that, I do not think it remotely deals with the problem of the growth of world population. To go from 6 billion which we are now at, a few months ago, I am told, to 12 billion in a matter of 50 years and to continue at this exponential rate is a problem. I need to be extremely careful about this in terms of concern about family planning and all the rest, but one way or another we have to address that rate of growth of world population, which is on a scale which is frightening. We have taken a million years, or least a quarter of a million years since *Homo Sapiens* were dominant on the earth, and we reached 1 billion—I do not know when, I would suspect about 1800, and the rate of growth now is so fast that we have to address that directly, but I do think that GM technology can make some useful contribution, yes.

(*Mr Rooker*) I tend to agree with that and we have to use words carefully but the supply of food for a population growing at that rate is probably not the most important of the issues that the planet will have to face, to be honest. The issue is extremely serious and, of course, we always get told off that we in the developed world should not tell the undeveloped world what to do about some of the issues but, frankly, trying to learn from our own mistakes of the past I think is useful. But I agree with Michael, I do not think it is the answer. Obviously claims are made for genetic modification for crops developed to grow using less water and less fertiliser indeed. Those claims can all be tested. As far as the third world is concerned, I think we can do what we can. Certainly our International Development Department will be concerned about making sure that farmers are able to exercise the same choice and control over their

practices as we are encouraging our farmers to do in this country. It is not a question of offering the third world on a plate, if you like, to the biotech companies and I think the leaders of those countries will be very concerned and we will certainly do what we can to assist.

Dr Iddon: We had on Tuesday a list of the members of MISC 6, the new Cabinet Committee. An obvious exception was membership from DfID. Could I, therefore, ask each of you what kind of relationships there are between your individual departments, MISC 6 and DfID, because, in view of what was just said, the international dimension is clearly going to be increasingly important?

Chairman

399. We have finally silenced you.

(*Mr Rooker*) Yes, I know, because one of the biggest problems I have in Government is remembering when decisions have been taken but not yet announced.

400. Which category is this one?

(*Mr Rooker*) Therefore, I think we would probably be better off to say that that issue is being addressed.

Dr Iddon

401. Finally, from my point of view, we reacted to climate change rather late in the day. The signals from the scientists were there for a long time before international agreements and international meetings started to be established. Clearly this issue is going to go much bigger than the United States and Britain and the European countries. It is going to go international eventually. Indeed, the benefits may be even more important to the third world than they are to us. Therefore, has any consideration been given to setting up international agreements on the scale that we now have climate agreements and meetings over climate change?

(*Mr Meacher*) First of all, I would not wholly agree that we were slow to react over climate change. If I remember, the report of the Intergovernmental Panel on Climate Change in, I think, 1997, possibly 1996, produced that telling formula that for the first time it was believed there was a discernible impact on the global climate from anthropogenic emissions, in other words, man for the first time in the earth's history was actually influencing our climate. The action that followed in international terms was extraordinarily swift and the fact that it led to the Kyoto agreement in December 1997 is almost lightening quick judging by the way we do things internationally. So I do not think that is quite the case. Over this, there is equally great concern. We are disappointed that the Biosafety Protocol broke down. We believe that there will be international trade in GM products and that safe procedures do need to be put in place that safeguard the interests particularly of Third World countries, which need capacity building in order to make sensible judgments about how to handle these products, what they are, what their significance is, how they need to be handled, how they will impact on

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[Dr Iddon Cont]

farming practice in the very different circumstances of those countries. So we are very anxious to see the Biosafety Protocol re-instituted, the negotiations start again, provided we have a basis by which we believe we can get agreement. Maybe we also do need to look at an international convention on a wider scale, as you are suggesting. At the moment that is not the case.

Mr Baker

402. Could I ask you both, would you accept that the present problem—just to be clear about this—with the lack of food in developing countries is not the lack of food but the distribution of food within the world? There is plenty of food at the moment, is there not?

(Mr Meacher) I think there is a good deal of truth in that but my understanding again is that there are something like 1 billion people who are severely underfed in the world at the present time, if not facing starvation, severely malnourished, and probably another million who are well short of the minimum which is required for active health.

403. And one in five in this country is obese and we have mountains of food everywhere?

(Mr Meacher) I think we are getting into wider areas. I think distribution is partly to do with it but I do think if the population continues to increase at its current level the availability of food supply over the next 50 years, if it doubles in that time, is a matter on which we cannot safely presume there will be enough.

404. May I ask Mr Rooker what you meant the other day—just to be clear—when you said that GM food was unnecessary? That is how you were quoted anyway.

(Mr Rooker) I notice you only quoted the first bit of it.

405. I am asking you for clarification.

(Mr Rooker) I only said the other day, in answer to a question, exactly what I have said before. It is not the first time I have said this. When I was asked, are these foods necessary, the basic answer has to be no. That is the honest answer. They are not necessary in that sense of being asked and, therefore, it is not the Government's job to push them, as we have said before, one way or the other but to regulate the technology and to regulate food safety. So they are not necessary. We have just discussed the issue about the potential of biotechnology for the third world, and there might be an argument that because of climate and what can be done with changes that are not affecting our GM crops, because our GM is basically herbicide tolerance at the moment—there might be an argument to say this is necessary in order to supply this food, but if someone says, "Are these foods necessary? Do we have to have them?" the honest answer is no. That is no great shakes in saying that. That is not undermining what the Government is saying. It is just giving an honest answer to what is a question which is fairly asked but because it may not be the answer that people expect—they expect a load of waffle in defence of the technology or, "the Government said this, the Government said no"—people do not like straight answers and the honest answer to that question has to be no, but it is in the context of the totality. So you do not quote it out of context, please.

406. I just asked a question.

(Mr Rooker) I know you did.

Chairman: Thank you very much indeed. That was a very useful session and we are grateful to you for coming.

APPENDICES TO THE MINUTES OF EVIDENCE

TAKEN BEFORE THE ENVIRONMENTAL AUDIT COMMITTEE

APPENDIX 1

Memorandum from The Countryside Agency

GENETICALLY MODIFIED ORGANISMS AND THE ENVIRONMENT

The Countryside Agency is the new statutory body working to conserve and enhance the countryside, promote social equity and economic opportunity for the people who live there, and help everyone to enjoy this national asset.

To date, publicity over environmental concerns about the release of GMOs in the English countryside (i.e., when a GM crop is grown in a field) has centred on the predictable or unforeseeable effects on biodiversity. Whilst the Countryside Agency naturally shares these concerns, we should like to take this opportunity to highlight our interest in the possible effects on the landscape. In particular:

- the commercial-scale introduction of GM herbicide and insect resistant crops may further reduce the need for rotations. The range of crops seen in the farmed countryside is therefore likely to narrow, as increasingly only the most profitable are grown. Together this is likely to reduce further the diversity of crops seen in arable areas, and result in more monotonous landscapes;
- just as ordinary oilseed rape has already “escaped” to non-crop locations, so too could GM crops in the future. This would change the character of micro-scale landscapes such as hedgerows; banks and verges. The possible dominance by “superweeds” could have a similar effect;
- the possible reduction or even extinction of arable “weeds” and insect pests and the species that depend on them (such as insect-feeding birds, or insects and butterfly species dependant on certain plants) will reduce diversity of detail in the countryside;
- in predominantly grassland areas, the introduction of GM grass could have considerable landscape implications, especially if it enables the extension of the range of high productivity grasses (e.g., rye grass) into semi-natural vegetation, e.g., a GM grass which grows at lower temperatures could extend its range into upland landscapes, leading to the replacement of moorland/rough grazing;
- Countryside Commission sponsored research has suggested that landscapes are conserved and enhanced by organic farming, but this is threatened by GM crops, as to maintain their organic status, organic farmers must keep all their crops free of GM material. We understand that GM and ordinary crops can cross-pollinate each other at distances of up to 3 km, and so organic farmers could find their crops contaminated.
- Through the reduction of the landscape’s aesthetic appeal, the amenity/recreational value of the farmed countryside to walkers and others could suffer further long-term damage. The recreational experience will be further devalued through the loss of species number and diversity, particularly insects and birds. If, as a result of GM crops being herbicide tolerant, they are sprayed more, then users of footpaths and bridleways may have a heightened risk of exposure to toxic herbicide residues.

Although at this stage there is little direct evidence of the likely environmental effects of GM crops, their increasing use is likely to accelerate the trend towards uniformity and the erosion of distinctive landscape character.

April 1999

APPENDIX 2

Memorandum from the Environment Agency

1. The Agency welcomes this opportunity to give evidence to the Committee. Its evidence primarily addresses the Committee’s Question 2: *mechanisms for developing a strategy on GMOs*.

REGULATION

2. The Agency’s involvement with genetically modified organisms (GMOs) arises from essentially two different situations: the contained use of GMOs—which is regulated by HSE—where the GM organisms are confined within a laboratory or industrial premises; and the deliberate release of GMOs into the environment, either as crops or for other purposes, which is regulated by DETR.

3. The processes regulated by the HSE, and the basis of their regulation, are intended to ensure that no GMO material is present in any releases to the environment or, if it is, then it presents a low risk to human health and the environment. The Agency is currently informed about the use of GMOs by the HSE in the context of emergency plans, so that Agency staff attending an emergency incident are aware of the hazards that may be present and if the release may have an impact on controlled waters. The Agency is currently in dialogue with

the HSE. This is to ensure that it is also kept informed of the possibility that any GM material (that may still be “active”) may be present in any routine waste stream for which the Agency has regulatory responsibility; for example, discharges to water, solid waste or aerial emissions.

4. The deliberate release of GMOs into the environment is regulated by the DETR. For historic reasons the DETR public register of such releases is currently held in the Agency’s offices. This situation can cause confusion in the public mind as to who is responsible for their regulation. At the Agency’s request the DETR is considering whether the registers should now be held by their Regional Offices, with copies only being held by the Agency.

GMO USE AND ASSESSMENT

5. The growing of GM crops is likely to lead to a change in the agronomic techniques traditionally used for the crop varieties concerned. The type and frequency of herbicide applications, tillage regimes, and possibly fertilizer and irrigation regimes may change, depending on the specific nature of the modified crop trait. There have been competing claims as to whether these changes will be environmentally beneficial, or damaging (for example leading to an increase or decrease in the concentration of biocides and/or nutrient entering watercourses). Further research clearly needs to be undertaken to ascertain the accuracy of all such claims.

6. The Agency recognises that there are potential environmental benefits in the use of some GM materials, for example to decontaminate land and as environmental tracers of pollutants, providing that they can be shown to be environmentally safe to use. It is therefore keen to follow all recent developments in both use and safety assessments.

7. Overall, however, the Agency supports a precautionary approach and sees its role in this difficult subject area as being primarily that of:

- providing advice on the environmental monitoring and assessment regimes that should accompany GMO development and use, particularly in respect of the water environment;
- collaborating with the principal regulators of GMOs, to assess the implications of GM activities and GM use for activities for which the Agency is responsible (e.g., disposal of waste); and—
- supporting R&D to examine the wider potential environmental effects of GMOs.

8. The Agency is therefore:

- developing its existing liaison arrangements with other relevant statutory bodies (e.g., DETR, HSE, EN¹) to cover issues relating to GMOs; and
- keeping abreast with GM developments, both in terms of the possible impact on the environment, and the scope for developments specifically designed to bring about environmental improvements.

CONCLUSION

9. Although the Agency has no direct role in the regulation of GMO materials, it is concerned to ensure that any GMO use is fully evaluated and that environmental safety can be assured. It also recognises that there are both potential benefits and risks involved with their development and widespread use, and is therefore supporting other regulators in requiring that a precautionary approach—based on sound science—be adopted.

March 1999

APPENDIX 3

Memorandum from The Environment Council

GENETICALLY MODIFIED ORGANISMS AND THE ENVIRONMENT

INTRODUCTION

This submission concentrates exclusively on the question: “*What mechanisms exist, or are needed, for incorporating public values and concerns regarding the environmental implications of GMOs, alongside the results of scientific assessment, within the decision-making process?*”

The Environment Council submits evidence to this inquiry based on its experience of:

- being the UK’s foremost independent organisation advocating *managed stakeholder dialogue* in environmental decision making as the mechanism to enable public values and concerns regarding particular decisions/issues to be addressed constructively so as to develop ways forward which key stakeholder groups can live with or support; and

¹ English Nature.

- its practical experience of engaging stakeholders constructively to inform environmental decision making (e.g., *Brent Spar*, local and national dialogue on nuclear issues).

This evidence addresses the following key points in relation to GMOs:

- GM issues are characterised by a number of factors which lend themselves to managed stakeholder dialogue as the mechanism to address the complex issues, namely:
- growing number of stakeholder groups with a range of conflicting views and values;
- uncertainty in terms of the potential environmental (and other) implications of GMOs;
- conflicting scientific results which only serve to fuel uncertainty;
- perceived and actual commercial and other interests in one particular outcome;
- lack of agreement on the best way forward;
- growing public awareness, concern and campaigns.
- managed stakeholder dialogue provides the mechanism to address in a consistent way differing public values and concerns in relation to the environmental implications of GMOs and other environmental issues. It allows a move from *decide-announce-defend* to *define-agree-implement* policy /decision making (as referred to in the recent House of Lords Select Committee on Science & Technology report).¹
- a successful outcome will depend on generating buy-in to the way forward from a wide range of key stakeholders.
- managed stakeholder dialogue is different from debate which focuses on differences. Stakeholder dialogue seeks to identify and build on any common ground between stakeholder groups to establish effective ways forward and to inform the decision-making process.
- any stakeholder process particularly in contentious circumstances should be managed by an independent organisation, i.e. one that is not perceived as having any particular “content” position and is accepted as such by stakeholders.
- the credibility of any dialogue mechanism used is paramount if it is to constructively inform decision making—factors such as commitment, involvement of all key stakeholders and independence are vital.
- scientific results can and will be challenged. By using stakeholder dialogue to agree the parameters of any scientific studies (e.g., scope, who undertakes the study) the results are less likely to be challenged on the basis of flawed methodology, by groups who do not agree with the outcomes.

1. *Background: incorporating public values & concerns into decision making*

1.1 The recent Royal Commission on Environmental Pollution² report emphasises the need to engage with stakeholders to ensure that their values and concerns are incorporated into the decision making process. As so many diverse groups have an interest in the future of GMOs, The Environment Council has provided this evidence on possible ways forward using its experience of stakeholder dialogue methods which engage stakeholders in a constructive and managed way.

1.2 Such dialogues are a good inclusive way of addressing *how* solutions may be implemented. Their other strength is in providing a robust way of deciding, or recommending, *what* the solution should be.

1.3 In any issue which raises public concern to the degree that GMOs have, it is important that assumptions are not made about what concerns stakeholders and why they hold particular positions. These concerns must be explored to tease out the issues and priorities in order to discover the real interests and needs which any way forward will have to address if it is to satisfy public concerns.

2. *The Environment Council: A Brief Synopsis*

2.1 The Environment Council is an independent charity with over seven years experience of mediating in conflict situations as well as designing and managing complex multi-party stakeholder dialogues. In addition the Council is the UK's leading provider of training and awareness in the role of stakeholder dialogue techniques to make better environmental decision to business, NGOs, trade associations, statutory agencies and local & national government.

2.2 The Council believes that the best way to ensure sustainable solutions and the best environmental decisions is to involve stakeholders in the decision making process at the earliest possible stage where there is considerable uncertainty and differences of opinion about the best way forward. In other words, to *define* —

¹ House of Lords Select Committee on Science & Technology 3rd Report on the Management of Nuclear Waste, 10 March 1999.

² Royal Commission on Environmental Pollution 21st Report “Setting Environmental Standards” October 1998.

agree and—*implement* the solution rather than *decide*—*announce*—*defend* it (which may mean it cannot be implemented anyway).

2.3 The Environment Council has worked on local, regional, national and international environment issues ranging from building consensus about future plans and strategies to mediations in regard to specific situations.

2.4 Examples of work include the stakeholder dialogue to inform the decommissioning of the *Brent Spar* subsequent to the Greenpeace campaign in 1995; current local and national work around aspects of the nuclear industry; and exploring GMO issues for a leading food retailer.

3. What is stakeholder dialogue?

3.1 When subjects requiring expert opinion are examined the need for a properly designed dialogue process is often overlooked. Lots of attention may be paid to what the experts are saying, especially when they disagree, but the attention rarely extends to the process within which the experts are interacting. This oversight is akin to throwing a team of expert plumbers, bricklayers and carpenters together in the hope they will build your dream house—rather than appointing an architect to oversee the design and ensure that all the different experts work constructively together.

3.2 The fact that many public and private sector proposals enter protracted, highly adversarial and hugely expensive statutory processes is a direct consequence of overlooking the need for properly designed and managed stakeholder dialogues.

3.3 Ministers can often be faced with invidious decisions as a result of statutory decision-making processes, often having to decide between two or more “positions” at the end of legal processes based on adversarial science and legal frameworks. These legal processes and their consequences cost dearly—at Newbury, around £26 million was spent on security alone defending the decision.

3.4 Positions such as “sink the *Brent Spar*” vs “don’t sink the *Brent Spar*” are like the tips of icebergs. They are informed by people’s interests and, more fundamentally, their needs and fears (see figure 1).

3.5 Adversarial processes try to compromise around positions—or rule on a winner and a loser. Each side only guesses what motivates the other, with little or no effort being made to investigate the interests and concerns underlying the position statement. A stakeholder dialogue process, however, seeks to find common ground (shaded) and develop understanding of the interests of each party from that firm footing (arrows outwards and upwards).

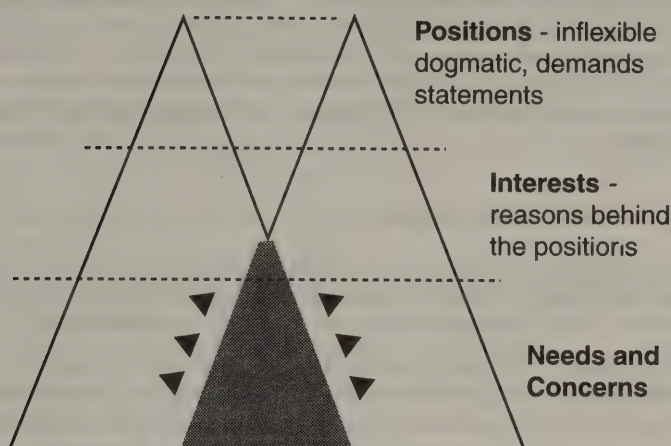
3.6 The way forward is built on this common ground and forms the basis of any collective recommendation to politicians. In other words the politician may still be facing a difficult decision but the understanding and agreement about what should be done is much more extensive—and the existence of a dissenting camp is much less likely.

3.7 Instead of spending time setting up a new body—and perhaps even committing parliamentary time to endorse this—all that is needed to get such a process started is a robust set of terms of reference for the process. In the interests of democratic accountability these terms of reference could be open to parliamentary and public scrutiny before the start of the process.

3.8 It must be emphasised that any approach to such a complex and value-laden issue as GMOs has to include a wide variety of stakeholders, not only in terms of participation in the dialogue but also in respect to the design of the process and provision of supporting information.

3.9 Stakeholders in the GM issue include members of the industry, its employees and suppliers, financial institutions, national and local non-governmental organisations (NGOs), national and local government, communities and academics amongst others. Each group expects and needs different things from the industry and its regulators. The best way of establishing these needs and mapping a way forward which is widely owned and understood is through a professionally designed and managed stakeholder dialogue process.

Figure 1. "PIN" Diagram



4. *Benefits of stakeholder dialogue*

4.1 The advantages of a managed dialogue over other methods of problem-solving and decision-making are numerous and include:

- Ultimately saving time, money and stress.
- Stakeholders will have a better understanding of the problems facing the industry and its regulators.
- A more positive relationship can be built amongst stakeholders based on trust.
- Better and more creative solutions can be generated which are more easily implemented.
- Future confrontation is reduced as stakeholders have had a role in the decision-making process.
- The public reputation of the organisation that initiated the process is greatly enhanced.

5. *Features of stakeholder dialogue*

5.1 The principal features of a managed dialogue process include:

- The process is designed and managed by a third party who has an experienced and independent team.
- The process is open and transparent.
- Stakeholders are involved from the start.
- Participants have access to expertise, knowledge and ideas, which would not normally be available to them.

6. *Stakeholder dialogue, "consultation" and the statutory decision making process*

6.1 The sort of stakeholder dialogue advocated by The Environment Council is *not* a substitute for the statutory process; Rather it is complementary to it. The results of the dialogue process can be fed into and inform the statutory proceedings. This is exactly what Shell did with its second decision over *Brent Spar* where the results of the independent dialogue designed and managed by The Environment Council were fed into the statutory Best Practicable Environmental Option (BPEO) process. One advantage of this *convening then statutory* approach is that the decision maker then has a clear idea both of the common ground and the areas and causes of any disagreement. Convening such dialogues, though a complex and skilled exercise, is relatively simple compared to, say enacting new legislation. In fact there is no process reason why a GM dialogue cannot start tomorrow.

6.2 There are two main errors in standard "consultative" processes. Firstly, regulators tend to talk separately to each party before reaching a decision, which leads to each stakeholder creating a "case". In its stakeholder dialogues, The Environment Council arranges large meetings of stakeholders with well defined views and concerns to allow them all to talk and discuss issues with each other in a structured way. In this way "dialogue"

is achieved between the participants and each is able to question and understand the others' points of view. Mutually agreed outcomes, questions and concerns are developed and noted on flip charts, so that the record of the workshop is constantly open to the scrutiny of the participants.

6.3 The second flaw is that the consultative process is laid down before the number of stakeholders is known. This can lead to problems if the estimate of the number of parties interested in attending any meetings proposed is wrong. If too many want to come then some may be excluded, which may compound conflict through alienation. The Council addresses this both by designing the meetings process to fit the numbers, i.e. *after* the stakeholding organisations have been established and by keeping the process design flexible in response to changing participant needs.

7. *Scientific assessment and stakeholder dialogue*

7.1 Dialogue is not a substitute for the sound science needed to underpin the complex and important decisions the GMO issue will require. However, managed dialogue *must* play a part in establishing the facts. This is because the source of "facts" in sensitive situations is always a potential source of conflict.

7.2 Science is only one basis for making important decisions for even scientists will admit that they used more than scientific criteria when choosing their husbands or wives. Science plays a vital role in environmental decision making but it should *inform* the decision rather than act as the exclusive decision making tool.

7.3 The problem is that few people recognise that even the simplest fact—or science—is based on assumptions. If people dislike what a particular study says then they may commission their own using different assumptions. This of course leads to conflicts in evidence and even the contracting out of the dispute to teams of experts in opposing camps, so heightening the adversarial nature of the debate and polarisation. Effectively addressing this point is essential to devising a successful way forward, assumptions are defined or at least agreed by those parties who have an interest in the outcome of such studies.

7.4 The Council addresses this problem through using jointly agreed fact-finding in its dialogue processes. Here, once there is a common understanding of the issue, participants decide what information is to be provided by whom and how. Dialogue participants, because they own the commissioning of the study, have to address the implications of the results coming back. Government needs to do this over the GMOs issue to ensure the credibility of the process and a firm footing for the way forward.¹ The recent withdrawal of the CWS from trials to establish the science appears largely attributable to the lack of agreed research objectives and parameters of any studies. This jointly agreed fact finding also provides and important foundation for agreeing contingency plans in case key assumptions turn out to be wrong (as a result of the inevitable research by scientists outside the process turning up new information which has to be taken into account).

7.5 However any dialogue is convened and however the science is derived, the closed question (one with a "yes" or "no" answer) forces people, including some scientists, to adopt a position for or against the proposal. The open question helps people establish there are potential areas of agreement between different parties—namely that GM issues raise concerns and something should be done to address them.

8. *Assistance with initiating stakeholder dialogue*

8.1 The Environment Council would be happy to discuss in more detail with government representatives how such a dialogue process might be convened. These discussions would need to cover the following issues:

- Initial scope—deciding conditions e.g., things that must/must not be part of the process.
- Initial aims—identifying what the process needs to achieve.
- Approach—confirming style of working and roles and responsibilities.
- Stakeholder analysis—establishing which organisations should take part in the wider dialogue process and, therefore, which should be represented.
- Time planning—establishing who should meet, when and to do what.
- Product—establishing what sort of outputs such as reports, agreements, recommendations and documents should come out of the process.
- Identify any levels of confidentiality surrounding any aspects of the process.
- Reporting to the Minister.
- Reporting back to interested parties.

March 1999

¹ The recent withdrawal of the CWS from trials to establish the science appears largely attributable to the lack of agreed research objectives and parameters of any studies.

APPENDIX 4

Memorandum from Friends of the Earth

GENETICALLY MODIFIED ORGANISMS AND THE ENVIRONMENT

INTRODUCTION

Friends of the Earth is pleased to have the opportunity of submitting evidence on genetically modified organisms and the environment to this inquiry. Our evidence, as far as possible, follows the Committee's questions set out in the press release issued on 2 March 1999.

Friends of the Earth (FOE) exists to protect and improve the conditions for life on Earth, now and for the future. Friends of the Earth is:

- one of the largest international environmental networks in the world with over 50 groups across five continents;
- one of the UK's most influential national environmental groups;
- a unique network of campaigning local groups, working in 225 communities throughout England, Wales and Northern Ireland.

Friends of the Earth have advocated sustainable food and agriculture since the early 1980s. The current Campaign for Real Food was launched in May 1997 following increasing concern over the rapid introduction of genetically modified food and crops into the UK and in order to promote more sustainable food and agriculture for the UK.

Friends of the Earth has actively participated in the public policy debate on GMOs through a number of means including:

- contributing to government consultations on the regulatory framework, changes to the Seed Regulations, labelling of GM soya and maize food products and the Food Standards Agency White Paper and draft Bill;
- maintaining regular contact with Ministers concerning the regulatory system for GM deliberate releases and risk assessments, seed law, farm scale trials and other matters;
- supporting Farmer Guy Watson in seeking a judicial review of the Government's procedures for the conduct of National Seed List Trials in 1998 and joining with three MPs in seeking judicial review of the non-statutory Provisional Seed Certification Scheme in 1999;
- handling an extremely high number of enquiries and information requests from the public and the media;
- publishing our independent research and information on the potential effects of GMOs;
- a large number of members of FOE and FOE local groups have attempted to participate in the advisory process and seek information on GMO releases as citizens.

SUMMARY AND CONCLUSIONS

On the basis of Friends of the Earth's wide and detailed assessment of the current situation with respect to the effects of genetically modified crops and food which we detail in this submission we conclude that the current processes for debating the need for, and ethics of, these releases and for assessing and managing their effects are wholly inadequate.

Despite various attempts on behalf of the Government and the biotechnology industry to address these inadequacies in the form of, *inter alia*, tinkering with committee remits, un-enforceable voluntary agreements and further commercially-driven trials, we remain convinced of the need for a minimum five year moratorium on:

- the growing of genetically modified crops for any commercial purpose;
- imports of genetically modified foods and farm crops;
- the patenting of genetic resources for food and farm crops.

FOE and the 50 other organisations who support the Five Year Freeze campaign are convinced that this moratorium is necessary in order to ensure that the protection of the environment and the public (in a situation where the effects are largely irreversible) is not subsumed by commercial interests. A legally enforceable moratorium would allow the following essential requirements to be put in place:

- public involvement in decisions on the need for and the regulation of genetic modification;
- assured prevention of genetic pollution of the environment and other effects on the wider environment;

- strict legal liability for adverse effects on people or the environment from the release and marketing of genetically modified organisms;
- independent assessment of the implications of patenting genetic resources;
- independent assessment of the social and economic impact of genetic modification on farmers;
- a system which allows people to exercise their right to choose products free of genetic modification.

After five years the moratorium and the results of research and public participation would be reviewed. If scientific evidence continues to show significant problems or uncertainty, an indefinite ban to that extent should be considered. There should be no automatic lifting of the moratorium simply by the passage of time.

1. STRATEGY FOR MANAGING THE ENVIRONMENTAL IMPLICATIONS OF GMOs

The current strategy for managing the environmental implications of GMOs is inadequate for the following main reasons:

- it is based on a flawed concept of risk assessment rather than the precautionary principle;
- it is not carried out in the context of the need for sustainable agriculture;
- it is not likely to meet current commitments to protect biodiversity;
- it takes a piecemeal approach;
- it fails to ensure public participation in decision making.

The management of environmental risks has to be based on a knowledge of what those risks are. The unpredictable nature of some of the consequences of introducing GMOs into the environment makes the use of traditional risk assessment, based on probability of events occurring, impossible to apply. The process is therefore fundamentally flawed and amounts to “taking a punt” on GMOs and embarking on a 20 to 30 year experiment in the countryside in the hope it turns out alright in the end. A more appropriate course of action is to follow the precautionary principle and work with existing and better understood agricultural systems to develop sustainable farming systems.

Friends of the Earth believes that there should be a full assessment of the environmental implications of all types of agriculture including that involving GMOs. A key starting point for such an assessment should be the Government’s obligation under the Biodiversity Convention and the commitments made in the White Paper “This Common Inheritance”. These oblige the Government to maintain and enhance biodiversity including that on agricultural land, as well as making a commitment to reduce pesticide use to a minimum. The Government has also produced Biodiversity Action Plans to enable us to meet our commitments. The Government published Sustainability Indicators in November 1998 which included farmland bird numbers as one of the parameters to be monitored.

Despite the 1989 Royal Commission on Environmental Pollution Report on GMOs, the current strategy for assessing the impact of GMOs bears the mark of a piecemeal development in response to events, rather than as part of an overall biodiversity, the environment and the rural economy. A fresh strategy should properly address these issues, and include an assessment of the ethical, social and economic issues pertaining to the future direction of agriculture in the UK.

The current procedure is based on case by case assessment of risk within a limited scientific remit which excludes indirect and long-term effects. Genetic modification is a very complex issue and any strategy has to encompass these complexities. Decisions about the future composition of our food and the nature of agriculture cannot be based on the advice of scientists alone or on the narrow perspective of how the economy should develop. There are crucial ethical, social and economic issues which also have to be considered.

Because scientists do not agree even about the basic assumptions on which biotechnology is built many of the decisions to be taken are political. They should be political as they affect how society, the rural economy and the environment will develop. The active participation of the public in deciding what they eat and how it is produced is an essential reform. At present no body has a right to a formal hearing at any stage of the GMO regulatory process. The Government should establish regional citizen panels to assess the ethics and justification of proposed GMO releases. The active participation of people in the regulatory process will also require freedom of access to all information about the GMOs being released.

2.1 THE CO-ORDINATION OF EXISTING POLICY AND REGULATIONS

Current policy development on GMOs is split between the Department of the Environment, Transport and the Regions (DETR), the Ministry of Agriculture, Fisheries and Food (MAFF) and the Department of Trade and Industry (DTI). Each department has conflicting priorities. This conflict is also apparent within the Cabinet Co-ordinating Committee on Biotechnology and Genetic Modification. Dr Cunningham’s answer to a Parliamentary Question¹ illustrates the difficulties the Government is having in reconciling the various agendas

¹ House of Commons *Hansard*, 17 December 1998, column 645.

within Government; i.e., the need to protect the environment and human health versus the reluctance to regulate a powerful industry.

“The Government believes that the protection of human health must be the first priority in regulating biotechnology. The impact on the environment and on biodiversity must also be thoroughly assessed, and the ethical issues raised by biotechnology fully taken into account. At the same time, the Government believes that this technology has the potential to offer enormous opportunities for improving competitiveness of the economy and the quality of life in terms of health, agriculture, food and environmental protection, and that regulation should facilitate technological development by not imposing unjustified burdens on the biotechnology industry”.

The current regulatory system for releases and marketing of GMOs has a number of crucial gaps which prevent a coherent assessment of their environment impact:

- the Advisory Committee on Release to the Environment (ACRE) does not have a remit to examine the long-term, cumulative impact of full-scale commercial use of GMOs and associated chemicals. Their remit has only recently been extended to cover indirect effects although this new remit does not extend to reviewing all approvals given prior to this revision. On the one occasion when ACRE were asked to review a previous approval for a variety of GM oilseed rape they concluded that, despite new evidence which had emerged since their first decision, there was no reason to change their advice to the Minister;
- there is no provision for assessing long-term effects or cumulative effects of releases;
- social and economic impacts are not assessed, for instance the impact on rural employment of the introduction of GM crops;
- risk/benefits analysis is poor and often only examines a narrow range of alternatives. The assessment of GM crops should allow comparisons with all other agronomic options in the context of the development of sustainable agriculture;
- there is a lack of baseline knowledge about the environment into which GMOs are being introduced. Adverse effects cannot be detected if there is not a proper understanding of the receiving ecosystem.

An example of the lack of co-ordination in the regulation of GMOs is the assessment of changes in agricultural practice likely to arise from the introduction of herbicide resistant crops. The primary impact is likely to be on biodiversity and it would seem logical that the assessment should come under DETR. In fact it was carried out by the Pesticide Safety Directorate on behalf of MAFF, whose primary function is to promote agricultural production and not the other key issues which should be considered in developing a sustainable agricultural system and rural economy in the UK.

It is no longer acceptable for MAFF to have such a central role in deciding the future of farming. The rural economy needs to be more diverse to secure farming incomes in the future. There are clear roles for MAFF in researching and promoting best practice; for DETR in maintaining and enhancing biodiversity of farmland and for protecting water resources; for the Regional Development Agency in ensuring that the correct infrastructure and financial support are in place to enable a sustainable rural food economy to be developed.

2.2 GOVERNMENT INFLUENCE OVER THE DIRECTION OF DEVELOPMENT OF GM CROPS

In the past 50 years agricultural policy has been unduly influenced by the agro-chemical industry which has successfully established chemical intensive farming as the mainstream method of production in the UK. The influence of industry is also obvious in the development of GM crops.

The biotechnology and seed industry is actively lobbying Ministers and civil servants to a level which the public at large would find difficult to match. An example of the “success” of industry lobbying came last October when the Government withdrew a consultation document on the revision of the Seed Regulations the day before the consultation period closed and replaced it with a document that met industry’s demands.

The industry also appears to have undue influence on the decision making process from within the system itself. For example, eight out of 13 members of the Advisory Committee on Releases to the Environment have demonstrable links to the biotechnology industry and another has worked on a MAFF contract to assess methods for influencing public opinion on biotechnology.¹

Internationally, the power of vested interest was well illustrated when the Miami Group,² the countries producing commodity crops such as soya beans, prevented an agreement on the Biosafety Protocol in February

¹ The following members of ACRE work for companies or organisations which have received release consents for GMOs: Professor John Beringer, Dr Philip Dale, Mr John Macleod, Professor Nigel Poole, Dr David Robinson and Dr Ingrid Williams. In addition Dr Ian Garland and Professor David Onions work and consult, respectively, for companies involved in biotechnology. Dr Julian Kinderlerer has been involved in a MAFF funded project—Development of a Strategy to Promote the Public’s Understanding of Biotechnology published in July 1998.

² The Miami Group consists of the USA, Canada, Argentina, Uruguay, Chile and Australia.

1999. Lack of an agreement to control the cross-border movement of GMOs leaves states liable for action under the World Trade Organisation rules if they attempt to control imports.

Not only the regulation or releases but the development of GM crops in the UK and throughout the world is overwhelmingly dominated by commercial interests and imperatives. Academic institutions do not have sufficient funds to develop their research to the point of commercialisation, so biotechnology companies “cherry-pick” the developments which seem to have the most commercial potential. The process favours applications which provide the potential for large profits, rather than those which could bring social or environmental benefits. For example, 27 out of 29 GM crops currently under consideration for National Seed List are for herbicide tolerant varieties which have been heavily criticised from an environmental perspective, but which provide obvious commercial rewards. In effect, this means that agricultural applications of genetic modification only progress beyond the experimental stage if they have significant commercial potential.

A further example of undue commercial influences is the so called farm scale trials with which the government are proceeding. These trials are commercially driven. In fact, they are not trials but “plantings” that can be grown under marketing consents. This view is borne out by the fact that the industry is planting what they are in a position to plant—no more, and no less. The farm scale trials are essentially “environmental studies” tagged-on to commercially-driven plantings. The plantings are not intended to assess environmental effects and are scientifically inadequate, for example by the lack of baseline data.

In Friends of the Earth’s view the only plantings that should be supported are those which are environmentally-driven. Field tests should be kept to a minimum and should be suitably designed and situated to gather the information required for the research. Extensive monitoring must be paramount. Agronomic tests can be carried out at the same time but the test sites must be predominantly designed for the national research. This is not what we have at present.

Such environmental testing can only be achieved by firstly deciding what environmental impacts need to be researched. The starting point for this is:

- the list of 54 pieces of research currently in progress (as at last October—set out in Appendix B to Friend’s of the Earth’s “Case for the Moratorium”) appended to this document;
- English Nature’s list of 39 Topics for Future Research on GMOs in the Agricultural Environment;
- plus an extra 10 topics identified by FOE (set out in Appendix C to the “Case for a Moratorium” document).

A more detailed critique of the farm scale trials is appended to this document.¹

As the use of biotechnology in agriculture is dominated by agro-chemical companies. The direction in which GM crops are developing reflects the needs of their shareholders rather than the environment and the farming community. In these circumstances, the ability of a national government to direct the development of GM crops is very limited unless there is global agreement. Indeed The Food Safety Minister, Jeff Rooker admitted as much to the Environmental Audit Committee on 31 March 1998:

- *“In terms of driving it forward in the way you put it, I am sure we are not in the driving seat. We have our science and laboratories. Industry itself is applying that science and it is our job to regulate their outturn, their products, and to make sure that every conceivable check and balance and a very stiff regulatory approval process is in place for these new products that come along. In five years’ time I cannot say. Simply on the scale of change in the last five years, for a start, things are moving very fast, as you appreciate, and I do not think I can forecast where we will be in five years’ time”.*

In this context the Government can best influence the direction of GM crop development by developing policies which influence the desired type of prevailing farming practice in UK agriculture. Policies which promote environmentally sensitive practice and enhancement of biodiversity will have an impact upon the use of GM crops and the type of modifications.

In contrast to the influence that the rush for commercial development of GM food and crops appears to have had on decision makers is the marginalisation of the voice of the public and, indeed, the wider farming community. These sectors have found themselves attempting to inout to the debate after the event; GMOs are in their food and permits to grow have been given. There is an urgent need for the Government to halt the progress of GM crop commercialisation and start to listen to the people who grow and eat food. It is not acceptable that the future of our countryside and the quality of our food is being decided in boardrooms and Whitehall where the influence of trans national companies, such as Monsanto, is all too obvious.

2.3 THE ASSESSMENT OF DIRECT AND INDIRECT RISKS OF GM CROPS

The widening of ACREs remit to include indirect effects of GMO releases and marketing consents in November 1998 is welcome. However, the revision did not take into account the need to review the previous inadequate risk assessments for the first generation of GM crops in the pipeline for commercialisation. Neither

¹ Appendices not reproduced except No. 1.

ACRE's new remit or their previous one allowed for an assessment of the long-term and cumulative impact of the widespread growing of several varieties of the same crop. This omission needs to be addressed urgently by the Government.

Problems with the inadequate assessment of direct and indirect risks associated with GM crops fall within the following categories:

- failure to consider GM crop type and ACRE's approach;
- the inadequate quality of companies' risk assessments;
- inadequate provision of new information by companies;
- inadequate monitoring of test sites;
- inappropriate application and weakness of the Simplified Procedures;
- releases made by persons other than the consent holder.

We consider these in turn below.

1. *Failure to consider GM crop type and ACRE's approach*

The reliance of current risk assessment procedures on a case-by-case approach—assessing individual GM crops out of context—has allowed a serious deficiency to develop.

There are intense commercial pressures to make the most of each type of genetic modification in order to recoup development costs. This means that GM crops tend to develop by types, rather than as a range, of distinct modifications. For example, in recent years a range of crops have been modified to tolerate various herbicides or to resist insect attack, with each crop having similar or identical gene insertions. Although the impact of the genetic modification on the plant genome must be assessed on an individual basis, there is also an imperative to assess the impact of the GM crop type on agriculture and the environment.

For example, the widespread commercial release of a number of different herbicide tolerant crops may have significantly greater impact on the environment than the introduction of a single crop. Herbicide tolerance to a range of weedkillers in crop plants could result in multiple resistance developing in wild relatives and crop volunteers and in long-term degradation of farmland biodiversity through reduction in cover and food plants. Therefore, it is essential that a risk assessment by type of crop modification is required.

The narrow remit of ACRE means, even when considering applications for marketing consent, that indirect and cumulative impacts of releases have not been considered.

The lack of consideration of indirect effects can be illustrated by ACRE's assessment of genetically modified herbicide tolerant (GMHT) crops. ACRE commissioned a report on this subject entitled "Commercial Use of Genetically Modified Crops in the UK—the potential wider impact of farmland wildlife" which revealed important gaps in our knowledge about the impact of GMHT crops. However, this was done *after* they had approved Plant Genetics System's (PGS) oilseed rape marketing application and so the conclusions of their own report could not be taken into account.

ACRE have similarly failed to consider the cumulative impact of releases. For example, in a review of their decision relating to PGS's application it was stated that:

"The generation of persistent glufosinate tolerant weed populations . . . is possible but in our view likely only if current patterns of crop rotation and herbicide application are substantially changed".¹

ACRE used this statement to justify their position, ignoring the fact that the widespread introduction of herbicide tolerant crops will almost certainly change patterns of crop rotation and herbicide use. In fact, the sole reason for the commercial introduction of GMHT crops is to change farmers' herbicide usage to the advantage of the developing company.

2. *The inadequate quality of companies' risk assessments*

Friends of the Earth has conducted an analysis of 60 applications for the release of GM oilseed rape from 1995–1998, in particular examining the quality of risk assessments and the record of consent-holders in providing up-to-date research.

FOE's analysis has led to serious concerns about the quality of risk assessments and the information provided to ACRE.

¹ Executive Summary of Environmental Risks of Herbicide Tolerant Oilseed Rape: a Review of the PGS Hybrid Oilseed Rape, December 1998.

For example, in the former respect:

Monsanto

In application 95/R22/3 by Monsanto, for the release of glyphosate tolerant oilseed rape, the risk assessment states that:

"natural gene transfer from Brassica napus to other cultivated Cruciferae has been demonstrated, including Brassica rapa, but not to weedy relatives Brassica nigra, Brassica adpressa, Sinapis arvensis or Raphanus raphanistrum. Natural hybridisation at low frequency has been demonstrated when weeds have been used to pollinate male sterile oilseed rape plants".¹

No references were given.

This statement was then used by Monsanto and five other companies in a number of subsequent applications:

- by Plant Breeding International (95/R2/3 and 95/R2/6);
- by Nickerson Biocem (96/R5/8);
- by Monsanto (96/R22/6, 97/R22/9 and 98/R22/13);
- by John K King (96/R28/1);
- by Pioneer Genetic (97/R24/2); and
- by Biogemma UK (previously Nickerson Biocem)(98/R5/13).

However, during this period, 20 pieces of research were published which significantly altered the known risk of hybridisation occurring (see Appendix 2).²

It is obvious that the companies involved either made no attempt to discover, or to inform DETR of, the most up-to-date information relating to their GM plant. Rather, they were allowed to lift sections of a risk assessment by an earlier applicant in preference to under take their own research, even when the previous statement was out-of-date. At no point, on the basis of the public documentation we have seen, did ACRE comment on this obvious plagiarism, nor did they criticise the outdated statements given.

Plant Genetic Systems

Plant Genetic Systems (PGS) used the same risk assessment year after year, changing little except the application heading.

Application 95/R15/14 states that:

"according to a study by Scheffler and Dale (1994), only four species can hybridise with Brassica napus by open pollination; Brassica rapa and Brassica juncea using fully fertile parents; and Brassica adpressa and Raphanus raphanistrum using a male sterile Brassica napus parent" and that "poor vigour and high sterility of the hybrids will generally mean that hybrids and their progeny will not survive in either an agricultural or natural habitat."

This same statement of risk was then used in nine other applications: 95/R15/15, 95/R15/16, 96/R15/18, 97/R15/19, 97/R15/20, 97/R15/21, 97/R15/22, 97/R15/23 and 98/R15/24.

In 1995 this was a reasonable assessment of the known hybridisation by oilseed rape with its wild relatives. However, as is obvious from Appendix 2, a great deal more was discovered in following years.

In a report for ACRE written in 1998 (Gray, A J and A F Raybould, 1998. *"Environmental Risks of Herbicide Tolerant oilseed rape: A review of the PGS hybrid oilseed rape"*), it was noted that various published research indicated that as well as the four species mentioned by PGS, oilseed rape was capable of forming hybrids with wild cabbage (*Brassica oleracea*), hoary mustard (*Hirschfeldia incana*) and in certain circumstances charlock (*Sinapis arvensis*). The authors also noted that:

"the production of herbicide tolerant hybrids must be considered a realistic possibility".

So, despite the obvious inaccuracy of PGS' risk assessment, it was included in post-1995 applications without change. At no point, on the basis of public documentation, was PGS questioned about this, nor did ACRE comment upon the out-of-date risk assessments provided.

Perryfields

Applicants must submit a description of the release site ecosystem, including the climate, flora and fauna. The purpose of this requirement is to provide a reasonable assessment of the likely impact of the introduction of the GM plant. However, in the vast majority of cases the ecosystem is so poorly described that it would be impossible to make any kind of judgment about the likely impact.

¹ Section C2.

² Not reproduced.

In the case of Perryfields Holdings' applications to release GM oilseed rape (96/R27/1) the release site ecosystem is described as "*mixed arable*" or "*areas suitable for commercial oilseed rape production*". This provides absolutely no information of ecological value and is a common, rather than exceptional, type of response. There is also a requirement to describe sexually compatible release species at release sites, but in the same application there is no mention of related species or of a botanical survey having been undertaken in the area around the release site. The applicant only mentions proximity to non-modified oilseed rape. Once again this is commonly the case.

Scottish Agricultural College

In contrast with the above examples, with respect to applications to release GM oilseed rape, only one applicant, the Scottish Agricultural College, provides a thorough and referenced assessment of the likely risks posed by GM oilseed rape, and they themselves propose the risk minimisation strategy required to ensure the safety of the environment.

The problem with the quality of companies' risk assessments has also arisen in connection with GM maize:

Sharpes International

As well as our analysis of the risk assessments for GM oilseed rape applications, FOE analysed the risk assessment in respect of GM maize as a part of our support for organic farmer, Guy Watson, who challenged its growing in the Court of Appeal last summer.

In the case of the relevant application (96/R13/6, by Sharpes International Seeds), none of the assertions in the risk assessment relating to pollen dynamics, pollen viability distance of pollen travel and likely outcrossing rates were referenced. On the basis of their unreferenced assertions it was accepted by the ACRE that most of the pollen from the GM maize was unlikely to travel more than six metres and that outcrossing would not be a problem.

At the time the application was made, a great deal of published research was available which was directly in opposition to the applicant's risk assessment, but none of this was included (see Appendix 1).¹ On the basis of publicly-available documentation, ACRE did not question the assertions made or the lack of supporting evidence for the claims.

Almost all companies

The purpose of test site releases should be to develop clear research into the behaviour and impact of GM crops. Studies looking at issues such as seed production, growth rates, survival and interaction with non-target organisms and wild relatives are a prerequisite for making judgments about the safety of GM crops. According to FOE's research, as of September 1998, out of 155 applications for deliberate release consent, only four specifically mentioned environmental research as the purpose behind the release. In practice, only a small proportion of deliberate releases have actually examined such issues, with the majority examining agronomic characteristics of GM crops in order to establish commercial potential.

3. *Inadequate provision of new information by companies*

Under Section 112(5)(b)(i) of the 1990 Environmental Protection Act, consent holders are required to:

"notify the Secretary of State of any new information which becomes available with regard to any risks there are of damage to the environment being so caused" [by the release of the GMO].

In a Parliamentary Answer on 9 November 1998, the Government said:

*"Since 1 February 1993 . . . the Secretary of State has, with respect to Section 112(5)(b), not been notified of any new information on the risks of damage to the environment, but has received reports on the outcome of every release authorised."*²

However, in the period 1995 to 1998, 20 pieces of new information were published relating to the risk of releasing GM oilseed rape, in terms of the distance of pollen travel, the possibilities for hybridisation with wild relatives and the survival of those hybrids (see Appendix 2).³

FOE's examination of the public register has revealed that, notwithstanding the Parliamentary Answer cited above, the Scottish Agricultural College *did* mention one piece of research (work by Timmons *et al*), which

¹ Not reproduced.

² *Lords Hansard*, 9 November 1999, Column WA70 (Lord Whitty in reply to Lord Beaumont of Whitley).

³ Not reproduced.

suggests that pollen from oilseed rape can travel further than was thought previously, as well as supplying a copy of their own research into the survival rates of GM oil modified oilseed rape. This is the only example of which FOE is aware.

4. *Inadequate monitoring of test sites*

Under Section 112(5)(a) of the Environmental Protection Act 1990, consent-holders are required to:

"take all reasonable steps to keep himself informed (by reference to the nature of the organisms and the extent and manner of the release or marketing) of any risks there are of damage to the environment being caused as a result of their being released, or as the case may be, marketed".

In practice, this has meant that the DETR has required reports on the releases to be provided by specified dates.

Much of the concern about GM crops relates to the potential for cross pollination, transfer of genetic material to wild plants, impacts on non-target organisms and on biodiversity. However, in practice, such issues are not examined. In the case of monitoring of releases of GM oilseed rape, ACRE only requires companies to examine rates of volunteer emergence in following years.

The majority of monitoring reports read like agronomic studies—detailed information is provided about the growth, development and pest infestations of the crop, but nothing to indicate that the issues of environmental concern were examined in any way.

The following are some typical comments from reports on the monitoring of the releases found during FOE's analysis:

*"The agronomic performance of the lines was satisfactory . . . the transgenic plants demonstrated no important alterations in physiology or morphology in respect of the non transgenic control lines"*¹

*"The crop was checked visually at each monitoring visit, from emergence of the crop, vigour and general development throughout the growing season (sic). Pest and disease attack and resistance were monitored over the growing season. The conclusion was that the transformed crop did not look any different to the non transformed crops"*²

Out of 25 monitoring reports for GM oilseed rape on the public register, only one applicant (Scottish Agricultural College) actually mentions undertaking botanical monitoring around the release site, and is the only consent-holder which mentions removing potential pollen recipients from the vicinity of the trial site.

In all the time that ACRE has been examining these applications it has never publicly called to account those companies which have failed in their obligations. Nowhere in the public documentation is there any evidence that ACRE has questioned the quality of risk assessments provided, or the value of monitoring reports which refer purely to agronomic performance or required consent holders to provide up-to-date information about the risk of releases. In these circumstances, FOE concludes that ACRE has provided an extremely poor standard of scrutiny. We deserve better.

5. *Inappropriate application and weakness of the Simplified Procedures*

Between 8 March 1995 and 30 April 1998, 41 deliberate release consents were granted in the UK under the Simplified Procedures. Between 1 January 1995 and 30 April 1998, 107 deliberate release consents overall were granted. In the latter period, therefore, about four out of 10 of all deliberate release consents granted in the UK were by way of the Simplified Procedures.³

In applications made under Simplified Procedure, applicants do not have to notify all the release sites at the time of the application. This shows a fundamental flaw in the reasoning behind the process. The risk posed by a GM plant is a function of the plant and the environment into which it is released. It is impossible to establish risk by looking at the plant in isolation. Yet this is exactly how the current system works. There is also a requirement to notify proximity of the release site to officially recognised biotypes or protected areas, but as most release sites are not notified at the time of ACRE's examination of the application, this information is not available.

In addition to this fundamental flaw in the reasoning, the approval of GM crops under the Simplified Procedures highlights serious defects in the approach to GM crops, in particular:

- inadequate information on ecosystem interaction;
- relaxed information requirements;
- no "whole, a priori specified, programme of development work", and
- releases allowed over too many years.

We consider these in turn below.

¹ Reports by PGS under consents 95/R15/14, 96/R15/16, 95/R15/17 and 95/R15/18.

² Report by Perryfields under consent 96/R27/1.

³ See Parliamentary Answer, *Hansard*, Col WA 6, 1 June 1998.

Inadequate information on ecosystem interaction

It is stated in the Annex to the Commission Decision establishing the Simplified Procedures that GM crops can only be included on condition, *inter alia*, that:

"information is available on the interaction of the recipient plant species in the ecosystems in which the experimental and/or agricultural releases are scheduled".¹

Yet there are glaring gaps in knowledge about agricultural ecosystems including basic information on the wildlife present in certain crops. This was conceded by a recent report from MAFF's Pesticide Safety Directorate:

"The current status of biodiversity in arable crops is poorly understood. There is at present little independent research to allow an accurate prediction of the potential impacts on wildlife".²

and

"It is currently not possible to define exactly what degree of biodiversity is present in the agricultural environment".³

and, referring to the specific crops, that:

"It is not possible to make definitive statements as to the current biodiversity status of oilseed rape, sugar beet or maize".⁴

In addition, the ecological behaviour of agricultural crops is largely unknown. The emphasis in research has tended to be the agronomic performance of crops, with less about their environmental impacts. This lack of information about the behaviour of unmodified crop plants means that it would be hard to make comparison with GM crops and calls into question the basis of simplified procedure.

For example, researcher from the National Institute for Agricultural Botany (NIAB) are reported as stressing that comparisons between the behaviour of GM and non-GM oilseed rape were difficult to make as:

*"little data are available on how non-GM oilseed rape behaves"*⁵

This view is also supported by Professor Mark Williamson of York University (former ACRE member), who has written:

*"Two points are well established. The first is that although relatively few feral plants become problems, perhaps about 1 per cent . . . , almost all crops occur as transient feral individuals. The other is that most measured characteristics fail to predict weediness or invasiveness. We have to use unreliable tools, weak statistical relationships, to predict rare major events with long-term consequences."*⁶

Relaxed information requirements

The Genetically Modified Organisms (Deliberate Release) Regulations 1995 enacted the revision of the 90/220 Directive and the introduction of the Simplified Procedures. At this time, the information requirements for GM plants were significantly reduced, and the requirement to provide references and supported sources for information in applications were removed.

In the DETR Guidance Notes to applicants it is stated that it is:

"no longer necessary to describe the methods used to obtain information and give the relevant bibliographic reference. Similarly, the reference to standardised or internationally recognised methods or the name of the body which carried out the studies may be omitted".

Although the Guidance Notes recommend the use of references, in many cases, as referred to above, this is not done. In addition, current practice appears to allow applicants to copy previous applications.

FOE submits that public confidence in the regulatory system has been severely jolted by such a lack of rigour.

No "whole, a priori specified, programme of development work"

The Simplified Procedures allow companies to:

"submit a single notification covering a whole, a priori specified, programme of development work",

in which case the release sites and the number of plants released need not be submitted.

¹ Paragraph 2 of the Annex to the Commission Decision of 4 November 1994 establishing simplified procedures (94/730).

² Paragraph 5 of the Executive Summary of the "Scientific Review of the Impact of Herbicide Use on GM Crops" produced by the Pesticide Safety Directorate, MAFF (15 December 1998).

³ *Ibid*, Main Report, Section 6.2, paragraph 2.

⁴ *Ibid*, Main Report, Section 6.3.

⁵ Referred to in "Risk Assessment of Conventional Crop Plants in Analogy to Transgenic Plants" (Torgersen, H; Soja, G.; Janssen, I; Gaugitsch, H.; 1998), Environ. Sci. & Pollut. Res. 5(2) 1998, page 92, as contained in "Monitoring Commercial Releases of Genetically Modified Oilseed Rape", Proceedings of the X. Colloque International sur la Biologie des Mauvaises Herbes, Dijon, September 1996 (Sweet, J B; Shepperson, R; 1997)."

⁶ TIBTECH, Volume 14, December 1996.

FOE considers, however, that DETR fails properly to adhere to the Simplified Procedures by not requiring such a programme.

For example, in the *Watson* case,¹ the notifier was granted consent under the Simplified Procedures to release GM seeds for 11 years (from 1996–2006). However, no such programme was submitted. Basically, the application simply covered two GM maize lines (T14 and T25), with the purpose of the releases described as “National List Value for Cultivation and Use and related private trialing of Glufosinate-Ammonium resistant maize”, from 1996–2006.

There was no indication, for example of:

- which lines will be planted;
- at how many sites;
- in which years;
- in which specific trials;
- at which times, and
- in which parts of the country.

The notification seeks consent for the company basically to release whichever line they wish, at whatever number of sites they wish, in whichever trials (official or private) that they wish, at which times they wish and in which parts of the country they wish. (In the event, the original consent was limited to T14, but was varied to include T25 in 1998).

Friends of the Earth believe that this cannot reasonably amount to a “whole, a priori specified, programme of development work”. Simply requesting and being granted (after variation) consent to release as many or as few of either or both or neither of the two lines of GM maize as the company wish (subject only to notice of confirmation of the original risk assessment prior to a specific release “for information only”) without setting out in the application which lines will be planted, in which years, when, at how many locations, in which specific trials and in which parts of the country is not a whole, a priori specified, programme of development work. It is, rather, virtually, *carte blanche* within the consent for the company to do what they wish in these respects within the 11 year period.

In general, FOE submits that such a programme of work needs to be set out with more particularity, so that a company is not allowed, in effect, to “make it up as they go along”, and so that the DETR and the public knows (save, mainly, for the exact sites) at the time the consent is given precisely what will be planted, when, at how many locations, in which parts of the country and for what purposes.

Releases allowed over too many years

The Simplified Procedures only apply to “several releases”, “on several different sites” and, in the case of single notifications with the required development programme, “over several years”.

FOE submits that, for example, 11 years cannot fairly be construed as “several years”. We believe that four or five years would be a reasonable interpretation as a matter of English.

We see this excessive period of time of the consent to be linked to the failure to require a whole, a priori specified, programme of development work. Few, if any, companies would be prepared to specify a programme for such a length of time. This cannot, however, be a reason for not requiring such a programme.

6. Releases made by persons other than the consent holder

It is not, in FOE’s submission, a sound basis for preventing or minimising environmental harm for DETR to permit releases to be made by persons other than the consent-holder. Furthermore, this approach is, in our submission, contrary to EU law.

Article 5 of Directive 90/220 requires Member States to adopt the provisions necessary to ensure that “any person” before undertaking a deliberate release of a GMO, submits a notification, meeting specific requirements, to the competent authority.

Article 6.4 provides that:

“The notifier may proceed with the release only when he has received the written consent of the competent authority, and in conformity with any conditions required in this consent.”

¹ In July 1998, the Court of Appeal gave its judgment in *R v. Secretary of State for the Environment and MAFF, ex parte Watson*. This case was brought by Mr Guy Watson, an organic farmer in Devon, supported by FOE, the Soil Association and others. He was concerned at the possibility of cross-pollination between GM maize being grown near his farm by NIAB under national list VCU trials with his own organic maize crop. The deliberate release consent in the case (under the Simplified Procedures) was held by Sharpes International Seeds Limited (although “the notifier” had been D J VanderHave BV c/o Sharpes). NIAB held no deliberate release consent to carry out the trials.

Under the Simplified Procedures:

"The notifier can proceed with the release in question after 15 days from the date of receipt by the competent authority"

Section 111(1) of the EPA provides that:

"... [no] person shall import or acquire, release or market any genetically modified organisms . . . except in pursuance of a consent granted by the Secretary of State and in accordance with any limitations and conditions to which the consent is subject."

Alongside GMO legislation, a separate but connected strand of legislation is relevant in connection with GM seeds. Directive 70/457 of 29 September 1970 on the common catalogue of varieties of agricultural plant species (as amended) provides for the results of official examinations, particularly growing trials to be the basis for acceptance of varieties for commercialisation. These official examinations trials are conducted under the Seeds (National Lists of Varieties) Regulations 1982 (as amended) ("the Seed Regulations").

Under Regulation 11(1) of the Seed Regulations,

"The Ministers shall conduct or make arrangements for such tests and trials of a plant variety which is subject to an application for entry in a National List as appear to them to be necessary to establish that it conforms to the requirements of Schedule 2".

The requirements of Schedule 2 of the Seed Regulations relate to distinctiveness, uniformity, stability (DUS) and value for cultivation and use (VCU).

In a Parliamentary Answer dated 22 October 1998, one of the MAFF Ministers stated:

"National list tests and trials cannot take place until a consent to release has been obtained under the [Act and applicable secondary legislation] and they must comply with any conditions imposed in such release consents".¹

These national list tests and trials are conducted for MAFF by contractors, such as NIAB, the Scottish Agricultural College, the British Society of Plant Breeders and the British Sugar Beet Seed Producers Association. These contractors then, themselves, can further appoint yet another person—such as (and perhaps usually) a seed company—to manage the trial.

However, these contractors do not, in respect of these national list tests and trials, have their own GMO deliberate release consents under Directive 90/220. Rather, the contractors purport to rely upon the release consents granted to the particular company who applied for and were granted the GMO release consent in respect of those seeds, in order to establish the lawfulness of the releases involved in the tests and trials.

In other words, the national list tests and trials are being conducted by persons other than the notifier (under the terms of Directive 90/220). This is in clear contradiction of Article 6.4 and, in the case of the Simplified Procedures, paragraph 7.2 of the Annex to the Commission Decision.

In the *Watson* case, the national list trials were being conducted by NIAB next to Mr Watson's farm. The deliberate release consent in the case (under the Simplified Procedures) was held by Sharpes International Seeds Limited (although "the notifier" had been D J VanderHave BV c/o Sharpes). NIAB held no deliberate release consent to carry out the trials.

One of the arguments put forward to the Court of Appeal on Mr Watson's behalf was that under both the Directive and the Act, NIAB should have its own deliberate release consent. In this regard, it was stated in "the notification" (under the Directive) or "the application" (under the Act):

"The applicant notes that he has no automatic right of entry or direct control of National List VCU trials".

The Court of Appeal rejected this argument, remarkably without any reference to Directive 90/220. In the event, Mr Watson did not pursue the case to the House of Lords—which would have required a reference to the European Court on this point—not least because pollination of the GM maize would have occurred long before the case could have been heard.

FOE respectfully submits that the judgment of the Court of Appeal is in conflict with EU law and our complaint in this regard has been registered by the European Commission: UK law does not, in this regard, comply with Directive 90/220 and, where applicable, the Simplified Procedures Decision, in allowing GMOs to be deliberately released under national list tests and trials by persons other than "the notifier".

This is a serious issue, as regulation of organisms which could potentially cause significant and irreversible damage must be strict. To allow persons other than the notifier to conduct releases gives rise to the possibility of releasers not being aware of the conditions of the consent. It cannot be in the interests of the environment (or, conceivably, human health) to allow, effectively, an assignment of the consent to another, ostensibly-unconnected person, operating under another statutory regime.

¹ *Lords Hansard*, Column WA 182, 22 October 1999 (Lord Donoghue in reply to Lord Beaumont of Whitley).

A practical example of these difficulties arose in February 1999 when Monsanto plc and Perryfield Holdings Ltd pleaded guilty to, and were fined for, breaching the conditions of their deliberate release consents for GM oilseed rape, when a 6 metre pollen barrier was not maintained. In this case, the trial was a part of national list trials, contracted via MAFF to NIAB, who then appointed Nickersons Seeds Limited to manage the trial—and it was Nickersons who mowed down the barrier. As Monsanto stated:

“Unfortunately, Monsanto has no direct control over the running of these trials”¹

On the one hand, it can be said that these companies would not have incurred criminal liability (under the Act) had this “assignment” possibility not been in place. However, on the other hand, it also allows for the possibility of companies to argue for a mitigation of their penalty on the grounds that they had no “direct control” of the releases; and does not encourage the adoption of responsible practices by those actually carrying out the releases.

FOE’s view on the illegality of national list trials and tests is supported by two independent observers.² This illegality should be remedied immediately.

2(4) CONTRIBUTION OF GMOs TO SUSTAINABLE AGRICULTURE

Sustainable agriculture is based on low input systems which should not be confused with “low tech” or “low output” systems. “Low input” refers to the low use of mass produced chemicals and fossil fuel. Sustainable agriculture, by the scientific management of natural systems, can produce high yields of good quality crops. This is particularly useful in developing countries where the use of artificial inputs places an economic burden on farming communities which many can ill afford. Genetically modified crops are the next step up a ladder of intensification for farmers world-wide in which local skill and knowledge is replaced by expensive seeds designed to work with particular pesticides and in which production of seeds is strictly controlled by the developing company.

It is frequently claimed by the proponents of GM crops that they are necessary for sustained food production. Yet no one is starving because of a lack of GMOs in the world. They are starving because of political instability, bad farming practices, poor food distribution systems, lack of access to land, poverty and war. Arthur Chaguma, Food Security Division Manager of the Environment and Development Agency, Zimbabwe summed up the impact of agribusiness at a Farmer’s network conference in March 1994:

“Agribusiness promoted hybrid seeds among the peasant farmers of Zimbabwe with great efficiency and arrogance—indigenous seeds were considered inferior and primitive. Government extension services also aggressively promoted agribusiness, penalising farmers who intercropped to spread risk. Agricultural training in the region has been 100 per cent. Western: so there was a total failure in formal system to recognise and incorporate farmers’ knowledge in the use and management of plant genetic resources. The expansion of modern varieties of hybrid maize did not bring resource poor farmers to profit. On the contrary it aggravated household food insecurity, natural resource degradation and erosion of genetic stock upon which local farming systems depended.”

The same criticism can be levelled at the development of GM seeds.

Sustainable farming is based on sound scientific ideas and the dissemination of techniques neither of which can be marketed on a sustained basis, thus truly sustainable farming systems are of little interest to commercial organisations. In contrast, GM crops continue and extend the dependence of farmers on external inputs purchased from agro-chemical and seed companies.

The development of agriculture in the UK has been directed by large industrial interests since the 1940s. As a result farmers are now dependent on agro-chemicals for their pest control and fertility. Genetic modification of crops is a continuation of input based farming in which biodiversity, soil conservation and enhancement and food quality come a poor second to the needs of corporate shareholders. Sustainable farming has the potential to regenerate rural economies around the world and redirect profits to where they are most needed, but FOE does not believe that GM crops, as they are currently being developed, have any role to play.

¹ Monsanto plc Press Release, 17 December 1998.

² In July 1998, Professor Richard Macrory wrote: “On the surface, however, [Mr Guy Watson’s] argument on this point appears stronger than the Court of Appeal was prepared to admit, especially as the 1990 EC Directive on deliberate release of GM organisms requires that any person making a release must make advance notification and may proceed only when he has written consent. Allowing releases to be carried out by persons other than consent-holders or those under their control could also lead to difficulties of regulatory control, and the Government may have to consider an amendment to the legislation.” (ENDS Report 282, page 52, July 1998). The editors of the Environmental Law Reports have also recently written: “Simon Brown L J disagreed [with Mr Watson’s argument] and found that the consent was not personal but was merely an enabling power which could be transferred to any other body. Other parts of section 111 do seem to link the consent holder and the releaser much more tightly than this interpretation of the section. For example, section 112(5)(b) imposes a requirement that: ‘the holder of the consent shall notify the Secretary of State of the effects of any releases by him (emphasis added)’. If the releaser were not required to be the consent holder then it would be difficult to see how this statutory obligation would have effect It could be argued that in areas as sensitive as the release of GMOs it would be preferable for the authorising authority to be assured that the applicant for consent was also going to be the releaser in order to assess the competence of the person undertaking the release.” [1999] Env L R 327.

4. SEGREGATION AND LABELLING

Current legislation fails to give consumers real choice. The European Union labelling regulations (1139/98) contain loopholes which allow most foods containing ingredients derived from GM crops to go unlabelled, for instance vegetable oil and lecithin.

The Government's stated aim to include additives, such as lecithin, into the labelling requirements are welcome. However, on products such as vegetable oils, the Government intention not to require all products to be labelled leaves consumers with no choice. Thus those who have ethical objections to the genetic modification of plants will not be able to avoid such products. The rights of individuals wishing to avoid meat or animal products are respected through clear labelling yet it appears the same rights will not be extended to those wishing to avoid the products of genetic modification. A Cabinet Office paper leaked to FOE in February 1999 shows there is also concern within Government about this issue . . .

It states:

"Is our labelling line on soya oil tenable? . . . If people have ethical objections to GM processes, should they not have a real choice informed through labelling?"

Labelling on its own will not give consumers choice. Take the case of GM soya. Because the US soya bean trade mixes GM and non-GM soya together, it has proved difficult (but not impossible) for manufacturers to avoid GM ingredients. We need to ensure that segregation takes place before allowing the foods to be imported into the UK. The current UK position, as stated in the Government Response to the House of Lords Select Committee on European Communities on EC Regulation of Genetic Modification in Agriculture¹, is that segregation and labelling would not be permitted under WTO rules. FOE believe that this position seriously undermines the rights of individuals to choose what they eat. If the debate is left to the WTO rules and the Codex Alimentarius then any attempt to segregate and label is likely to be undermined. Rather, the Government could ensure that the issue is raised and resolved through the negotiation of a binding Biosafety Protocol (on which the EU is currently reforming its position).

The argument that it is not practical to segregate commodity crops such as soya and maize does not stand up. Soya crops have long been segregated in the field to serve the demands of the tofu industry. Several UK-based companies have already announced that they have secured GM-free supplies of all soya products. There are numerous example where foods are segregated at the point of production so that consumers are allowed choice based on the method of production. For instance all eggs are labelled as to what method of production is used and organically produced products across the range are clearly labelled and traceable. GM-free soya and maize are in demand in Europe and could be serviced through similar dedicated supply chains in the United States or from other major soya producers for both GM and non-GM products. Crops will be required to have an audited supply chain to ensure that labelling remains accurate. It is only a lack of will that is preventing this occurring for soya and maize products. It is important that the costs of segregation should be borne by those introducing GM crops into the market rather than those companies who chose to stay with non-GM varieties.

FOE is also concerned about the Government's consideration of a 2 per cent. contamination threshold for GM-free status as stated in the Government's Response to the House of Lords Select Committee on the European Communities.² This acceptance does not appear to be based either on food safety considerations, the best practice for cleaning handling or transportation equipment or the detection limits for novel DNA in the best available technology. No agreement on contamination thresholds should be agreed until the following have been achieved:

- food safety procedures have been reviewed and improved to ensure that all health effects are screened for before a product enters the market;
- clear guidance is available to farmers to prevent contamination through cross pollination;
- current practices for cleaning, harvesting, handling and transport equipment between crops or batches has been investigated and evaluated as to how that could be improved, e.g., operator's standards or redesign;
- an investigation into how individual crops could be most effectively "tagged";
- an investigation of how the costs of handling GM and non GM crops separately can be apportioned along the GM supply chain.

5. SCOPE FOR IMPOSING A MORATORIUM ON COMMERCIAL GROWING OF GENETICALLY MODIFIED CROPS IN THE UNITED KINGDOM

The Minister for Agriculture and officials have made several statements suggesting that there is no legal basis for the UK to impose a moratorium on the growing of GM crops. Indeed, Minister Jeff Rooker stated in a letter to FOE, dated 29 October 1998, that:

"there is no legal power to impose a moratorium on planting of GM crops, and we have therefore had to take a different approach".

¹ House of Lords Select Committee on the European Communities EC regulation of Genetic Modification in Agriculture.

² *Ibid.*

Previous to this letter Mr Rooker told the House of Commons Environmental Audit Committee on 31 March 1998 that:

"We cannot stop, as a UK government, those crops that have already been approved in the European Union from being planted"

and that:

"We..are in no position, as I understand it from legal advice and we have asked about this, actually to insist on a moratorium on the planting of these crops. They have received approval within the Member States of the European Union and, as such, we are in no position".

FOE was concerned that the Government was not receiving the correct legal advice on the matter of whether or not the UK could impose a moratorium on the growing of GM crops. Several organisations had been calling for a moratorium to allow time to assess the long-term impact of GM crops on the environment.

To seek clear guidance on this important issue, FOE and the Royal Society for the Protection of Birds sought the opinion of Philippe Sands, an expert in international law, as to whether the UK Government has the power to impose a moratorium on commercial growing of GM crops in the UK which was consistent with European Union and World Trade Organisation law.

The conclusions to Philippe Sands' opinion indicated that "good arguments" could be made for such a move by the Government. Mr Sands' conclusions are given below and his full opinion appears in Appendix 3.¹ Mr Sands has indicated that he is happy to answer written or oral questions the Committee may wish to put to him.

F. CONCLUSIONS

This is not an area in which certainties of any kind prevail. I would not wish to underestimate the weight of legal arguments and evidential issues which might be marshalled against the adoption of a moratorium by the UK Government. However, good arguments can be made to support the view that a moratorium on the commercial growing of GM seeds would not be contrary to EU and WTO law.

For the reasons set out above, in my opinion:

1. (1) the inability of Article 16 of Directive 90/220 to permit the United Kingdom to adopt a general moratorium (even provisional) on the commercial growing of GM seeds does not prevent the United Kingdom from being entitled to adopt, under Article 100a(4) of the EC Treaty, a general moratorium on the commercial growing of GM seeds if the measures: (a) can be shown to be justified on grounds of environmental protection; (b) are not a means of arbitrary discrimination or a disguised restriction on trade; and are proportionate to the aims to be addressed (i.e., no less trade restrictive measure is available);

(2) once it enters into force new Article 95(5) of the EC Treaty would allow the United Kingdom to adopt a general moratorium on the commercial growing of GM seeds if the measures: (a) are based on new scientific evidence (obtained after the adoption of Directive 90/220, or any amendments thereto); (b) are intended to address a problem specific to the United Kingdom; concern a problem that has arisen after the adoption of Directive 90/220 (or any amendments thereto); and (d) do not constitute a means of arbitrary discrimination or a disguised restriction on trade between Member States or an obstacle to the functioning of the internal market;

(3) a general moratorium by the United Kingdom on the commercial growing of GM seeds which was caught by Article III.4 and/or Article XI of GATT 1994 would fall within the exceptions provided by Articles XX(b) and/or (g) of GATT 1994 if it could be shown that: (a) the policy measure for which the provision was invoked fell within the range of policies designed to protect human, animal or plant life and health and that the measure was necessary to fulfil the policy objective; and/or (b) that the measure was concerned with the conservation of "exhaustible natural resources", relates to the conservation of such resources, and is made effective in conjunction with restrictions on domestic production; and (c) is not an arbitrary or unjustifiable discrimination between countries where the same conditions prevail, or a disguised restriction on international trade; and

(4) to the extent that a moratorium on commercial growing of GM seeds was an SPS measure within the meaning of the SPS Agreement (WTO), then it is properly arguable that the United Kingdom could adopt a moratorium on the basis of Article 5.7 of the SPS Agreement;

(5) to the extent that such a moratorium was not such an SPS measure and fell to be considered under Article XX GATT 1994, its presentation as analogous to an SPS measure would allow an approach analogous to Article 5.7 of the SPS Agreement to be adopted to justify such a moratorium.

FOE and the Royal Society for the Protection of Birds wrote to Rt Hon Michael Meacher enclosing Philippe Sands' opinion, copied to Dr Cunningham and Mr Rooker, seeking clarification of the Government's current position on a moratorium on the growing of GM crops in the UK. To date no substantive response to this letter has been received.

¹ Not reproduced.

6. ARE THERE ADEQUATE ARRANGEMENTS FOR CIVIL LIABILITY FOR ENVIRONMENTAL DAMAGE CAUSED BY GMOs?

There are not adequate arrangements for civil liability for environmental damage caused by GMOs.

Although the draft revised 90/220 Directive includes a far more rigorous approach to risk assessment than the one currently in force, the science of molecular biology and genetics is still in its infancy. Current genetic modification is therefore no more than an experiment—the consequences of which are entirely unpredictable.

As more GM crops and food reach the point of commercialisation, the question of attributing the blame for any harm caused arises. In the next decade, crops modified to include resistance to herbicides, insects, viruses and nematodes could be growing along with a variety of crops modified to produce certain chemicals or to alter their oil composition. Indeed crops including more than one of these traits could be grown. The transfer of herbicide resistance into wild relatives of crop plants could take many years before serious environmental problems begin to appear.

Thus the consequences of releasing GMOs into the environment are not well understood at present and some may not be predictable until they have occurred. Liability legislation has to take this into account if Government and industry insists on pushing ahead with commercialisation before the specific harm genetic modification could cause becomes clearly predictable.

The types of harm caused need to be considered. We list some possible scenarios below:

- cross pollination of a neighbouring non-GM or organic crops by a GM crop;
- problems arising from herbicide resistant crop volunteers;
- spread of resistance in weeds and pests;
- spread of viral resistance;
- long-term damage to predator populations;
- long-term damage to soil micro and macro-organism due to changes in pesticide regime;
- loss of biodiversity due to herbicides reducing weed and wild plants;
- the formation of new toxins in animal and human food;
- the development of new allergies due to the presence of novel proteins;
- loss of property value;
- failure of crops.

Friends of the Earth considers that there are primarily three legal issues which need addressing in this area:

- (i) how would damage be proved against a specific defendant: “causation”?
- (ii) what would compensation for environmental damage cover?
- (iii) under what legislation should such liability be introduced?

1. *Causation*

There will be a number of cases where it might be possible to attribute liability to a clearly-defined person whose release or marketing of GMOs has caused harm.

However, there will also be cases, perhaps greater in number, where it will be difficult to attribute the particular harm to such a person. This would almost certainly be the case in respect of personal injury from eating GM food. “Genetic finger-printing” would probably not be enough to overcome these hurdles.

For these reasons, Friends of the Earth considers that there needs to be established a two-tier liability system. Firstly, companies marketing and releasing GMOs should be held strictly liable where the relevant harm can be shown to be caused by them. Secondly, where it is not so possible, an industry compensation fund (c.f., Oil Pollution Compensation Fund; Motor Insurers Bureau) should be established, funded by a levy paid by the seed industry based on the weight of GM seed sold or the area of GM seed sown.

2. *Compensation for environmental damage*

Money spent in protecting the environment, and in remedying, rectifying or preventing environmental damage, must be recoverable. Human health and damage to property should also be covered, as Friends of the Earth does not believe that it is either right or wise to construct the “environment” as if it is artificially separate from the rest of everything, including the human species. “Environment” should be given a wide meaning, such as that included in the Lugano Convention on Civil Liability for Damage Resulting from Activities Dangerous to the Environment.¹

¹ Article 2.10 defines “Environment” as including “natural resources both abiotic and biotic, such as air, water, soil, fauna and flora and the interaction between the same factors; property which forms part of the cultural heritage; and the characteristic aspects of the landscape”.

Compensation should cover, for example, the cost of re-introducing species and biodiversity lost, the cost of gathering of base-line and post-release monitoring data, compensating farmers who could not use their land for non-GM crops in areas where contamination from GM crops was possible, as well as compensating organic farmers for the loss of organic status as a result of cross-pollination.

3. Legislative provision

At present there is no express legal requirement for civil liability for harm caused to public health and the environment caused by the release of GMOs either commercially or from test sites in the UK. The proposal to amend EU Directive 90/220/EEC on the deliberate release into the environment of GMOs approved by the European Parliament includes a new article to cover strict civil liability, however this has been rejected by the Commission. The uncertainties surrounding the effects of GMOs mean that it is essential that the companies marketing GMOs and releasing GMOs in test sites are made strictly liable for any harm caused to human health and the environment. The unpredictable nature of genetic modification make traditional risk assessment, based on probabilities of events occurring, very difficult.

Friends of the Earth believe that the principle of strict liability for health and environmental damage, and the industry compensation fund, must be expressly established in the revised Directive 90/220.

It is not adequate for the issue to be "hived-off" into any revised Product Liability Directive, not least as this Directive is not concerned with environmental damage, but also because it would bring with it a potential "state-of-the-art" defence. Such a defence has no place in a system of genetic experimentation to which the current state of GM "technology" amounts.

Neither do we support dealing with liability in a so-called "horizontal" environmental liability Directive. We see such proposals as an industry-driven and Commission-supported delaying tactic to ensure that strict liability does not hamper the development of GMOs. Both the industry and the Commission know full well that such a Directive has been years in its gestation and it will take several years again before it could be agreed.

Rather, there is a need for the GM industry to show that it is deserving of public trust. And the clearest way of doing that is to say: "yes, we are so confident that this stuff is completely OK that we will accept liability for it if it goes wrong".

ANNEX 1

Oilseed Rape—New Research on Gene Transfer December 1994–November 1998

Date	Research	Findings
December 1994	R B Jorgensen and B Andersen "Spontaneous hybridization between oilseed rape (<i>Brassica napus</i>) and weedy <i>B. Campestris</i> (Brassicaceae): a risk of growing genetically modified oilseed rape" <i>American Journal Botany</i> 81(12) pp. 1620–1626	Spontaneous hybridisation in the field between <i>B napus</i> and <i>B Campestris</i> (syn <i>B rapa</i>). Rates of up to 60 per cent. hybrid seeds detected as well as <i>B napus</i> genetic markers in natural <i>B campestris</i> populations
November 1995	Lefol, E, V Danielou, H Darmency, F Boucher, J Maillet and M Renard. "Gene dispersal from transgenic crops. I. Growth of interspecific hybrids between oilseed rape and the wild hoary mustard" <i>Journal of Applied Ecology</i> 32 803–808	Oilseed rape shown to hybridise with hoary mustard. Hybrids have intermediate characteristics and are more competitive than their hoary mustard parent
November 1995	Wilkinson, M J, A M Timmons, Y Charters, S Dubbels, A Robertson, N Wilson, S Scott, E O'Brien and H M Lawson, 1995. "Problems of risk assessment with genetically modified oilseed rape" Brighton Crop Protection Conference—Weeds. November 1995	Findings that gene transfer to feral populations of oilseed rape is likely to occur
November 1995	Linder, C R and J Schmitt. "Potential persistence of escaped transgenes: performance of transgenic oil-modified Brassica seed and seedlings" <i>Ecological Applications</i> 5(4) 1056–1068	Research indicating that the gene for high laurate production in GM oilseed rape may confer competitive advantage to <i>B rapa</i> hybrids
November 1995	Darmency, H, A Fleury and E Lefol. "Effect of transgenic release on weed biodiversity: oilseed rape and wild radish" Brighton Crop Protection Conference November 1995	Wild radish (<i>Raphanus raphanistrum</i>) shown to be able to hybridise with oilseed rape in field conditions

March 1999

APPENDIX 5

Memorandum from Greenpeace

1. Greenpeace is an international environmental pressure group with offices in over 30 countries and 2.5 million supporters world-wide. Greenpeace is independent of governments and industry and is supported by donations from members of the public. Greenpeace maintains an international science laboratory at Exeter University and has a long-standing involvement in debates around use of science in environmental policy-making, and respects the essential and positive value of science in policy making. Greenpeace has been working and campaigning against the release of genetically modified crops and food for about 10 years. It is our belief that there should be a ban on genetically modified food and farming.

SUMMARY

2. In our view, there is no reason for science to be out of step with public values. Instead, what is often termed “the scientific approach” is a complex of unacknowledged values and assumptions. These should respect the “informed reflection and debate”, the public attitude to risk and the need to answer big picture questions that emerge from, particularly, new technical and scientific developments. When the values and assumptions in a “scientific approach” are out of step with widely held environmental and social values then both science and the regulatory bodies can lose trust and respect.

PUBLIC VALUES AND THE SCIENTIFIC ADVISORY PROCESS

3. For instance, Greenpeace believes that to carry credibility the scientific advisory function needs to be in resonance with widely held public values. This is not currently the case with genetic engineering and food and farming. Nor is the scientific advisory function being performed in a strategic way. Instead it examines genetically modified (GM) food applications on a narrowly based case-by-case examination of safety. This leaves both value-based unease amongst the public and “big picture” questions unacknowledged and unanswered, leading to an erosion of trust in both science in general and in the political institutions responsible for it. We conclude that only a re-framing of the context in which the scientific advice operates will provide public confidence.

4. Some of these approaches to risk are bound up with what has become known as the *precautionary principle*. This principle is really a combination of concerns expressing an attitude towards scientific uncertainty and environmental risk. These concerns are expanded upon below in the context of genetically modified food and crops. However the notion of precaution in the case of uncertainty is a very widely held one, for example:

“I hope that politicians making the rules on GM foods will remember another golden rule. If the possible—even if unlikely—consequences of doing something are huge, ask yourself if it is really necessary to do it.”

Such a quote might be expected to come from an environmental philosopher or pressure group. In fact it was from Norman Tebbit.¹

5. “Values are an essential element in decisions about environmental policies and standards. People’s environmental and social values are the outcome of informed reflection and debate”² *Royal Commission on Environmental Pollution*. This quote illustrates one of the most difficult elements of designing a scientific advisory system; when the outputs of scientific committees are not in tune with public values, it may be the “informed reflection and debate” that is right, not the expert view. With respect to genetically modified food and crops, the key components of the values that are brought to the debate are set out below.

6. There is a different reaction to risk acceptability and scientific uncertainty than is often found in technical assessments—the fact that public reaction to risk is different from the quantitative assessment (in itself actually an assessment with hidden value judgments) has long been recognised. Reactions to uncontrollable, poorly understood, inequitable, intergenerational and potentially catastrophic risks are likely to be negative. These reactions are not, as often characterised, “irrational” but represent perfectly rational judgments based on an individual’s experience. Note that the “objective” risk assessment in relation to genetically modified food and crops have embedded value assumptions that are out of step with most publicly held social and environmental values.

7. For example the current approach of the scientific approval process is based on an assumption that all developments in genetically engineered food and crops are a good thing unless specific scientific evidence can be found to say it is not. This is an assumption with which Greenpeace and, according to much opinion research information, the majority of the public would disagree. Further, whatever the precise probability of harm from GM food, no person or body has had to justify why the risks it poses should be imposed on society and the

¹ Norman Tebbit, 21 February 1999. Don’t set aside GM risks, *Mail on Sunday*.

² Royal Commission on Environmental Pollution, 1998. Twenty-first Report, Setting Environmental Standards. HMSO, October 1998.

environment for the benefit of corporate profit. The value judgment underpinning assurances of safety is that it is acceptable for uncertain risks to be taken by the public at large whilst the benefits (in the form of profits) go to the biotech companies like Monsanto.

8. There is a requirement for *justification* of proposed products or developments like GM food and crops (sometimes referred to as the question of “need”). In the case of genetically modified food and crops, the inequity of risk makers versus risk takers raises the requirement for a broader societal justification of such risks both to an individual’s health and to our environment. It is further important to note that the ability of an individual to control a risk is a feature of its acceptability, and more “experts” telling everyone that they should eat GM food will rightly be rejected. The lack of a tractable regulatory mechanism for the concept of “need” does not negate its importance as one of the most common reactions by non-experts to genetic technology.

9. The use of genetic engineering raises for many people fundamental questions about humankind’s relationship to nature. These arise both from religious and secular concerns about whether nature is being respected and whether fundamental boundaries are being crossed.

10. There is a clear public desire for less “interference” with food—this is difficult to pin down but is a very strongly felt desire both in opinion polls¹ and in consumer buying patterns, most notably organic produce.²

11. None of these values currently inform the scientific advice system. It should be recognised that public values are not just one of a collection of wider issues that need to inform decisions “after the science is done”. Rather values should apply to the whole structure and framing of policy and scientific assessment. A nascent recognition that values are at the root of the decisions about which direction we should go in as a society was provided by Sir Robert May in discussing the impact of genetically modified crops, and the competing claims of agronomic efficiency and wildlife protection when he said: “*There are real social and environmental choices to be made . . . They are not about safety as such, but about much larger questions of what kind of world we want to live in.*”³

STRATEGIC ASSESSMENT AND “BIG PICTURE” QUESTIONS

12. One way of exposing the value judgments made in the use of a scientific advisory process is to ask “big picture” questions. Currently many of these big picture questions are answered by default and lead to a framing of the issue in ways that are not “recognised” by and certainly has no resonance with the public at large. As Sir Robert pointed out, science does not operate in a vacuum but instead operates in a context defined by answers to “big picture” questions. For GM food that context is expressed in the values underpinning the construction of the regulatory and scientific advice process. Currently many of these big picture questions are answered by default and lead to a framing of the issue in ways that are not “recognised” by and certainly have no resonance with the public at large.

13. None of the Government scientific advisory committees on genetically modified food have addressed these bottom-line or strategic questions, for example is GM food necessary; is GM food wanted; are the risks posed by going down this path in food policy acceptable; are possible alternatives not being looked at; will these developments take us where we, as a society, want to be? The advisory committees may point out that such “big picture” questions are not within their remit; but these questions have not been dealt with elsewhere. The result is that the advisory committees’ case-by-case approvals of GMOs appear to the public observer to be a means to answer “yes” to all these questions without debate.

14. Currently the Government approach is that all developments in genetic engineering are a good thing. The default assumption is that GM food is a good thing unless specific scientific evidence can be found to say it is not, and the problem is that the public need to be persuaded, against their will, to accept them. This is an assumption with which Greenpeace and, according to much opinion research information, the majority of the public would disagree. For example, the MAFF R&D Surveillance Report 361, is, in the early stages, quite neutral but later demonstrates that one of its stated objectives in designing “a strategy for promoting public understanding” is actually one for promoting public acceptance.

15. Genetically modified soya has been allowed to pervade the human food chain on the basis of a narrowly technical risk assessment (largely on the basis of Monsanto’s own data). No person or body has had to justify why the risks it poses should be imposed on society and the environment for the benefit of corporate profit. Furthermore, risk assessment does not allow any overall consideration of the possible cumulative impacts of consumption of many genetically modified foods. Yet, due in part at least to a scientific advice system that has disallowed assessments other than case-by-case analyses of these products, such potential impacts are now imminent.

16. The result of all this is that there has been a ceding of responsibility to scientific committees but those same committees have not the remit to accept responsibility. Politicians hiding behind experts may be a way of

¹ Audience Selection, 1999. Opinion poll, Taylor Nelson, February 1999. Eighty-one per cent. of people polled wanted more money to be put into developing organic produce and food compared to just 10 per cent. into genetically engineered food.

² Soil Association, November 1998. The Organic Food and Farming Report 1998. Sales of organic food in supermarkets is growing at around 40 per cent. per year in UK.

³ Sir Robert May, 1999. Genetically Modified Foods: Facts, Worries, Policies and Public Confidence, 15 February 1999.

avoiding political responsibility in the short-term, but as demonstrated by both BSE and the recent furore over GMOs, this does not in turn mean avoidance of political risks. If a problem should now arise after millions of people have eaten genetically modified soya or another GM food over a period of years or decades, the backlash will be quite legitimate because the most basic questions (see paragraph 13 above) were never asked. This is a scientific-political advice system which is riding for a fall. Exclusion of big-picture questions about technological trajectories from the frame of debate is closely related to the exclusion of discussions about precedent-setting. This was illustrated most dramatically in the attempted disposal of the Brent Spar.¹ The same mistake is being made with GM food.

EXPERT ASSESSMENT OF RISK AND BENEFIT

17. In the post-BSE period it is worth noting that there are now plenty of examples where the “lay” estimation of the risk has proved to be a better estimation than that of the expert community or “science” itself. Examples include the risks from synthetic chemicals, especially pesticides, the impact of low levels of radiation, and the likelihood of a serious nuclear accident like Chernobyl occurring. Professor Ziman, Emeritus Professor of Physics at Bristol University shows appreciation of the extent of scientific uncertainty in his eloquent description of scientific knowledge as “typically fragmented into little islands of near conformity surrounded by interdisciplinary oceans of ignorance”.² This also serves to highlight the limitations of the viewpoint of scientific experts whose framing of an issue is strongly influenced by, or even implicitly defined by the bounds of their specialism.

18. Such problems are not, of course, only questions of academic judgment but also relate to commercial and political pressures. Professor Strohmman observes that “academic biologists and corporate researchers have become indistinguishable, and special awards are given for collaborations between these two sectors for behaviour that used to be cited as conflict of interest”.³ For the scientific advice that is the regulatory system, there is a much more subtle but nevertheless important and valid point than overt conflicts of interest: this is the shared value judgments between commercial and academic scientists which decide which questions should and shouldn’t be addressed.

19. In the light of the heavy commercial involvement with basic research thrown up by the development of genetically engineered food and crops, the viewpoints and values of the public at large deserve especially strong recognition, rather than, as now, no recognition at all.

March 1999

APPENDIX 6

Memorandum from Green Alliance

GMOs AND THE ENVIRONMENT

GREEN ALLIANCE

Green Alliance is one of the UKs leading environmental policy organisations. It works to ensure that the environment is a prime consideration in commercial and political decision-making.

Green Alliance has been a commentator on biotechnology policy since 1987. Since 1990, Julie Hill, former Director and now Programme Adviser to Green Alliance, has been a member of the Advisory Committee on Releases to the Environment (ACRE). She is also presently acting as an adviser to the Office of Science and Technology on the Public Consultation on the Biosciences, and to the Nuffield Foundation on Bioethics on a report on the ethical implications of genetically modified plants. Green Alliance has been responsible for a series of seminars and debates on biotechnology policy involving a wide range of interest groups, including environment and consumer groups, regulators, scientific advisers and companies.

OVERVIEW

Green Alliance has identified a number of ways in which the current arrangements within Government for policy on the development and use of GMOs needs to be augmented. The needs are: the ability to take a strategic view of the likely contribution of GMOs to sustainable agriculture, which means a strategic view of

¹ Both Shell and the Government tried to play Brent Spar as a technical debate about a one-off case. The public saw it differently. The (NERC) Scientific Group on Decommissioning Offshore Structures in 1996 criticised the inappropriate framing of the Brent Spar debate. “Any decision to proceed, or not to proceed, with dumping oil structures or other wastes in the ocean involves, social, economic, ethical and aesthetic considerations which are outside the competence of this group, and judgments in which the technical assessment of the environmental impact is only one factor, and not necessarily the most important one.” “Science” was used to justify the dumping of the Brent Spar, but the mis-match between the Government framework and the (more sophisticated and accurate) public understanding of the situation has led to a decreased trust in the reliability of scientific advice.

² Ziman, J, 1996, Is Science Losing its Objectivity?, *Nature* vol. 382, p. 751-754, 29 August 1996.

³ Strohmman, R, 1997, The Coming Kuhnian Revolution in Biology, *Nature Biotechnology*, vol. 15, p. 197-200, 15 March 1997.

the environmental impacts of GMOs, and usefully of food and health implications as well; better co-ordination of the work of the current scientific advisory committees; a mechanism to incorporate “stakeholder” interest into decision-making in order to better influence the direction of the technology; and a set of ethical standards to more fully incorporate the values and concerns of a wider public. It is our conclusion that at least one new body is needed, at pan-governmental level, to fulfil these needs. However, it is not clear that one new body could take on all these tasks, and a suite of new institutional approaches may be needed.

1. Is there a need to develop a strategy for assessing and managing the environmental implications of the release of GMOs?

Yes. There has been an absence of strategic thinking about how GMOs will affect the UK environment.

The aim of the regulatory system for genetically modified organisms is to ensure the safety of human health and the environment (as framed by EU directives or regulations on release to the environment, contained use and on novel foods). However, environmental safety has, within this system, been interpreted quite narrowly as being primarily about the impacts of the spread of genes from crops to wild species. Less direct effects, such as possible changes to patterns of pesticide use resulting from the use of GM crops, and possible changes to land use, have only recently been acknowledged as valid considerations in assessing environmental safety, and have only recently been made a formal part of the remit of the Advisory Committee on Releases to the Environment.

Further, the regulatory system grants approvals for GM products on a strictly case-by-case basis, limiting the ability of policy-makers and those sitting on the scientific advisory committees to look ahead at forthcoming products, and limiting in particular the ability to consider possible cumulative effects of GM products.

The combined effect of these characteristics has been the absence of a strategic view of how GM introductions will affect trends in agriculture in the UK, and thereby affect the environment, whether positively or negatively. Although there are potential environmental benefits from some types of GM crops, the concern is that some developments, particularly herbicide tolerance, will alter the pattern of herbicide use in ways which will exacerbate existing declines in the wildlife present in the agricultural and semi-agricultural environment. This might compromise the UK’s ability to meet its obligations under the Convention on Biological Diversity.

The present scientific advisory committees therefore need to be augmented by a body that is capable of taking a strategic view of how far GMOs might help or hinder progress towards more “sustainable” agriculture. As well as considering the broad range of environmental effects, such a strategic view could usefully embrace all the implications for food and health of the use of GM in agriculture and food production. Such a strategic view needs to develop at pan-governmental level, so that it involves all the relevant government departments.

SHOULD THIS STRATEGY INCLUDE THE FORMAL ASSESSMENT OF THE ENVIRONMENTAL BENEFITS OF GMOs ALONGSIDE THEIR RISKS?

A mechanism for assessing benefits as well as risks would enable policy-makers and the public to judge whether the technology is likely to fulfil society’s needs, and whether the risks are justified. The existence of such a mechanism, and the debates that would inevitably arise from it, would help to reverse the current feeling that the technology is being developed in isolation from the concerns and aspirations of ordinary people.

There are a number of challenges in establishing a governmental mechanism for looking at benefits as well as risks. These include:

- having enough information to make a proper assessment of benefits;
- deciding who is qualified and credible to pronounce on the benefits;
- deciding the baseline for evaluating both risks of benefits i.e., whether they should be judged relative to existing practices, or relative to an ideal situation;
- deciding how far alternatives to GM technology are taken into account in any judgment about benefits;
- deciding whether, and how, to weigh up risks and benefits i.e., whether to engage in trade-offs and accept a higher level of risk in return for benefits, or reject low-risk proposals because they offer no benefits.

Despite these potential difficulties, Green Alliance recommends that in the interests of promoting wide public debate, companies proposing to release GMOs into the environment should be required to present an assessment of possible benefits, particularly environmental benefits, at the same time as they present assessments of the risks. Information about possible environmental benefits will certainly need to be taken into account in any comprehensive assessment of the indirect impacts of GMOs on agriculture. How these statements of benefits are evaluated and taken into account in the approvals process needs to be the subject of much wider debate.

2. *If so, does the Government have adequate mechanisms for developing such a strategy, in terms of:*

- The co-ordination of existing policy and regulation

There is a need for better co-ordination of the work of the existing scientific advisory committees. Co-ordination is needed to ensure that there are no gaps in the coverage of the possible risks associated with GM, and that the committees work to consistent risk assessment methodologies. It is also important to ensure that all the committees work to the same recruitment procedures, the same transparency procedures, and the same rules about whether members “represent” particular interests. Any mechanism for co-ordination should include the chairs of the relevant committees, and representatives from all interested Government Departments, but should also incorporate outside expertise.

- Oversight of, and influence over, the direction of the development of GMOs

This is a crucial part of developing a strategic view and there is no mechanism for such oversight at present. In order to have sufficient information about the likely directions of the technology and how they might be influenced, the Government will need to seek detailed engagement with the companies developing and marketing GMOs. This might be through an explicit “stakeholder forum” which has been proposed by Environment Minister Michael Meacher. Such a forum would comprise representatives of different interest groups, including companies, NGOs, and scientists, who could be asked to ascertain the current directions of the technology and make recommendations for how it should develop in future. The success of such a body in influencing the direction of the technology might depend on whether it was given any explicit powers, as opposed to being primarily a discussion group.

Oversight and influence might also be achieved through the negotiation of a joint Government/industry code of conduct, which could set out the kinds of GMO development considered acceptable or unacceptable according to a range of criteria, of which contribution to environmental quality would be one.

- *The assessment of direct and indirect risks, including the cumulative impact of GMO releases over time*

The move to ensure that ACRE covers the indirect as well as direct effects of GMOs in agriculture is very welcome, as is the initiative by DETR and ACRE to study the wider impacts of GMOs on biological diversity. However, ACRE’s future deliberations must be underpinned by a set of protocols for assessing indirect environmental effects that command widespread credibility and confidence throughout the relevant government departments, with scientific opinion, and with outside commentators such as non-governmental groups. ACRE has been heavily criticised for failing to take these aspects of releases into account to date, so now that it is beginning to do so, it should do so in a way that has the assent of all the relevant interest groups.

However, the Government needs to ensure that:

- ACRE has the right membership, in terms of types and level of expertise, to give sound expert advice on “indirect” effects. The majority of ACRE’s membership changes in June 1999, providing an opportunity to expand the expertise available.
- ACRE develops protocols for assessing indirect effects that command widespread credibility among all the interested parties, i.e., the Government, the Government’s statutory nature conservation advisers, environmental groups, and the companies developing and using the technology. It is not yet clear that ACRE has the means to secure input to, and ownership of, the protocols from all these groups.
- The Government’s new policy of excluding direct employees of companies and of environmental groups from membership of ACRE is not likely to be a hindrance to this process of securing ownership for ACRE’s new remit.
- ACRE and DETR have sufficient mechanisms for liaison with MAFF and the Advisory Committee on Pesticides (ACP) to ensure that work on assessing the environmental impacts of the pesticides used in conjunction with GM crops is complementary, and not conflicting.
- *The contribution that GMOs might make to more sustainable agriculture*

This debate should be informed by the mechanisms developed for assessing and judging indirect effects. However, a general goal of furthering “sustainable agriculture” needs to be an explicit part of Government policy, and a specific body needs to be charged with the aim of ensuring that GM makes only positive contributions to this goal. To facilitate this, the Government will need to agree with key interest groups what are the main criteria of “sustainable agriculture”. Work to assess the possible contribution of GMOs to sustainable agriculture needs to be continuous and iterative, concentrating on possible cumulative impacts.

3. *What mechanisms exist, or are needed, for incorporating public values and concerns regarding the environmental implications of GMOs alongside the results of scientific assessment, within the decision-making process?*

The Government needs to have much better intelligence about the values and concerns of members of the public before it can make effective policy. It is unclear how far people have principled or consequentialist objections—i.e., whether they think that genetic manipulation is intrinsically wrong, or whether they object

because they fear that such manipulation will have adverse consequences, even if it is difficult to foresee what they might be. The first step is to build on the work being undertaken by the Office of Science and Technology Public Consultation on the Biosciences by commissioning further detailed public opinion research to probe these issues.

Once this intelligence has been gathered, we recommend that the Government work towards a set of ethical standards for biotechnology policy and regulation. "Ethical" is not just one of a set of "wider" issues, or just one dimension of regulation (for instance the labelling of GM foods to which certain religious groups might object) but should apply to the whole of policy and regulation, which should be framed and conducted according to a widely accepted set of standards. Such standards provide a means of addressing basic questions such as whether a particular GM line of research or product in development is acceptable or unacceptable in principle to particular groups of people, or to society as a whole. It is not cost effective to take a GM product through all its development and safety testing stages and then present it for safety clearance if there are likely to be fundamental objections that cannot be handled at this late stage. These standards are likely to need a new body, constituted at pan-departmental level, to develop them and oversee their application.

It is also important that the Government recognises that whatever mechanisms for advice are put in place, including an "ethics" body or a "stakeholder" mechanism, Ministers must be seen to be taking responsibility for final decisions. No source of advice, however sophisticated, can or should replace the democratic accountability of Ministers. The proper role of new mechanisms is to augment and enhance that accountability by ensuring that Ministers have access to comprehensive and competent advice.

4. What is feasible and desirable in terms of preserving consumer choice by segregation and labelling—particularly the issue of "labelling for process" to provide for consumer influence over the use of GMOs and their environmental implications?

It is likely that some consumers will wish to avoid GM foods on grounds of their possible environmental impact as well as, or instead of, concerns about food safety and ethical objections. For this to be a realistic choice, any foods using GM ingredients at any stage in their production would have to be labelled, whether transgenic proteins are still present or not. This would require complete traceability of all ingredients. We have made no formal assessment of the feasibility of this, but since traceability for certain commodities is already an established and accepted practice, the costs may not be as great as commercial interests sometimes imply.

5. What scope does the UK and EU have for policy initiatives, and what are the prospects for multilateral agreement, on the release of GMOs into the environment—with particular reference to the World Trade Organisation and GATT disciplines and obligations?

Both the EU collectively and the individual Member States should have the ability to set conditions on the development and use of GMOs if they fear their environment may be adversely affected. Different countries have different environments, and the relationship between the agricultural environment and wildlife varies considerably, so differing levels of concern about the impact of GMOs are inevitable. National governments should be arguing for the adaptation of trade rules to take account of such variation, and for trade rules to be subordinate to international environmental agreements, particularly the Convention on Biological Diversity.

Another way to avoid the possibility of national initiatives on GMOs coming into conflict with trade rules is to persuade the companies developing and marketing the technology that is not in their interests to seek unconditional use of their products in all countries, or to appeal to trade rules when they are unable to do so. An international code of conduct is needed for the biotechnology industry that would require that companies take account of the environmental conditions in the countries in which they operate, seek to enhance the environmental wherever possible, and co-operate with any national initiatives designed to ensure environmental protection.

6. Are there adequate arrangements for civil liability for environmental damage caused by GMOs?

An explicit regime for strict environmental liability is needed. There should be no defence that damage caused by GMOs was not "reasonably foreseeable" which is a defence that has been applied to environmental liability cases in the UK. Given that all releases of GMOs go through a statutory risk assessment process that is intended to identify any adverse affects that are foreseeable, it seems likely that if there is any damage associated with GMOs, it will not have been foreseeable. However, reparation or compensation will still be needed, and someone must be held liable. Strict liability seems to provide the only answer to this dilemma.

APPENDIX 7

Memorandum from the Institute of Biology

1. The Institute of Biology is the independent body charged by Royal Charter to represent UK biologists and biology. It is pleased to be able to respond to the above consultation but regrets that, due to the time limitation, it has not been able to provide additional detail.

[The consultation's questions are in *italic*]

Is there a need to develop a strategy for assessing and managing the environmental implications of the release of GMOs?

2. Recent developments and interpretation of the existing assessment mechanisms suggest that it would be prudent to strategically review the existing arrangements.

Should this strategy include the formal assessment of the environmental benefits of GMOs along with their risks?

3. It should. Each release of a different type of modified organism has its specific risks and benefits.

If so, does the Government have adequate mechanisms for developing such a strategy in terms of:

(a) *the co-ordination of existing policy and regulation?*

4. The core components are in place but an interdepartmental consultation would facilitate co-ordination.

(b) *oversight of, and influence over, the direction of the development of GMOs?*

5. While much is being done by the Research Councils and the UK Science Base, equally much GMO development is being undertaken independently in the Private Sector and overseas. The UK Government therefore has limits to its influence on the development of GMOs.

(c) *the assessment of direct and indirect risks, including the cumulative impact of GMO releases over time?*

6. Government funded work in this area has only recently begun. While some GMOs (particularly those with no relative wild species within the UK) pose little risk, potential ecological risks may be associated with others. It may take a few years before we can begin to ascertain which of the higher risk of modified organisms may be released with safety and which classes pose higher risks, for which further research will be required before their low-risk release can be assured.

(d) *the contribution that GMOs might make to more sustainable agriculture?*

7. The scope of the full benefits of this technology has yet to be practically appreciated. In theory there is still considerable benefit to be achieved.

What mechanisms exist, or are needed, for incorporating public values and concerns regarding the environmental implications of GMOs, alongside the results of scientific assessment, within the decision-making process?

8. This is not a biological question. Nonetheless we consider it preferable that policy mechanisms should be publicly transparent so as to assure public confidence.

What is feasible and desirable in terms of preserving consumer choice by segregation and labelling—particularly the issue of the “labelling for process” to provide for consumer influence over the use of GMOs and their environmental implications?

9. While there is great public desire for there to be clear labelling as to the presence or not of GM material in the individual consumer's food chain this cannot always be guaranteed.

- (a) because the genetic modification may not be expressed in the final product (e.g., oil from soya) hence may not be detectable;
- (b) because the expression of the genetic modification may be within naturally occurring limits and therefore may not be detectable;

- (c) because the modified organism might have been used earlier in the food chain (for example non-modified cattle being fed modified grain) and hence may not be detectable.

10. If labelling were to become mandatory it may be advisable to have more than one class of label to take into account such limitations. The consumer could then decide on the risk.

11. It is not clear how environmental concerns could be incorporated into anticipated labelling legislation.

April 1999

APPENDIX 8

Memorandum from the Institute of Directors (IoD)

INTRODUCTION

1. This is the IoD's response to the Committee's public invitation to comment, for its inquiry into GMOs and the environment. We have addressed questions in the Committee's Press Release No. 10 of the Session 1998–99, dated 2 March 1999.

SUMMARY OF THE IoD'S RESPONSE

2. This is as follows:

- (a) There should be a Government strategy for assessing and managing the environmental implications of the release of GMOs. This should include formal assessment of environmental benefits as well as risks.
- (b) Better public presentation of policies is needed, along with information on the issue of risk and relative risk.
- (c) Taking account of public values and concerns about the environmental and other implications of GMOs alongside scientific assessment is a thorny issue, but it does need to be tackled.
- (d) Accurate information is essential in the operation of markets. Therefore the Government could assist with the dissemination of information about better tests for GM materials, to enable meaningful labelling and consumer choice. Market pressure by retailers on US suppliers of products such as soya may need to work alongside UK and European Union (EU) arguments for segregation of GM and non-GM products at source.
- (e) Many of the world trade issues over GMOs are unresolved. Both the UK Government and the EU will need to maintain a firm stance in this regard.
- (f) In considering issues of civil liability for any environmental damage caused by GMOs, the rights and safety of producers and researchers conducting legitimate approved trials and growth of crops must not be forgotten.

STRATEGY ON THE ENVIRONMENTAL IMPLICATIONS OF RELEASE OF GMOs

3. There is a need for a Government strategy covering the environmental implications of GMOs. The question of the potential environmental effects of GMOs requires soundly based applied scientific and other investigations. These other investigations should include economic appraisal and issues of public perception. Given that the findings from such work are likely to have implications covering many aspects of the nation's activities—business as well as personal—it is important to have a co-ordinated approach to the investigations, to the dissemination of the findings and to the implementation of any actions that may be recommended. There is a need to reconcile many different interest groups and at the same time attempt to formulate rational advice that commands widespread support. This is a task for Government. It should not be left to individual organisations, environmental lobby groups, consumer bodies or the agricultural, food and distributive industries alone.

4. Economic appraisal of whether to pursue a course of action should include a cost-benefit analysis. Therefore, in the case of considering the implications of release of GMOs, a strategy should include the formal assessment of environmental benefits of GMOs as well as risks, notwithstanding that there will be uncertainties and some unknowns about both benefits and costs.

MECHANISMS FOR DEVELOPING SUCH A STRATEGY

5. The public furore of recent months about GMOs in food has shown that there is a better need for co-ordination of existing policies.

6. One very important area is that of risk, both its estimation and the public perception of risk. There are several conventional crops that may in principle pose similar environmental hazards to GM crops. Whereas there is apparent widespread concern about GM crops, there are lower levels of concern about conventional crops ("A question of breeding", David Concar and Andy Coghlan, *New Scientist*, 27 February 1999, pages 4–5). Information is needed to help set things in perspective.

7. We would also not want examination of potential benefits of GMOs, for example in agriculture, to be lost sight of amidst some of the calls for moratoria and bans on GMOs. In all this it is important to be in a position to conduct a rational assessment based on the best available evidence and interpretation.

MECHANISMS FOR INCORPORATING PUBLIC OPINION WITH SCIENTIFIC ASSESSMENT

8. The question of GMOs is but one example of public opinion needing to be reconciled with scientific assessment.

9. On the one hand there is a perception of fear of possible harmful effects, and of the unknown. On the other there should be rational evaluation based on sound science. There has been a climate of confusion that has not been helped by media stories of “mutant tomatoes” or “Frankenstein foods”. Nevertheless, there also needs to be better information dissemination about GMOs and their effects, good, bad or indifferent, on the part of those organisations that deal or trade in them.

10. There are differences between countries. For example, public opinion surveys have indicated that people in Northern Europe are more wary of GM foods (and more sceptical about their benefits) than are people in Japan or the United States of America [*Genetically Modified Foods Benefits and Risks, Regulation and Public Acceptance*, Parliamentary Office of Science and Technology (POST), London, May 1998]. Over the period 1992–95 most consumers surveyed in Austria, Germany, Portugal and Sweden agreed that GM plants were a serious hazard to health, but in the USA only about a fifth did so. Over the same period, 65–75 per cent. of US consumers agreed that they were “generally positive” about the use of biotechnology in agriculture, in Japan more than 80 per cent. supported its use to develop better crop varieties, but in Austria and Germany up to 80 per cent. said that they would not buy foods derived from GM insect-resistant plants.

11. Research sponsored by Unilever, at Lancaster University (mentioned in the POST report referred to in paragraph 10), has also shown that, although people in the UK may be negative about biotechnology, they were not necessarily against GM products. Some products (such as medicines and vegetarian cheese) were viewed as more justifiable than others (e.g., baby foods and GM animals.)

12. We would agree with a *Nature* editorial about setting up broad-ranging panels to advise on the acceptability of GMOs, “that the chance to influence research is not used as an unyielding instrument of obstruction by fundamentalist opponents of genetic modification” (“Crop research meets the public”, *Nature*, Volume 395, 29 October 1998, page 823). If validated scientific evidence does arise to show that there are dangers this should be acted upon, of course.

13. The truth is that there are very many unknowns about GMOs, and particularly about any long-term effects of their use. Some of the discussions around the setting up of the Food Standards Agency involved public health arguments that one of the Agency’s roles should be of helping improve the public understanding of risk. It is not only the subjects of food and GMOs that would benefit from improved understanding. Possibly there would be less cost in terms of worry to populations as a whole were there better understanding of risk and relative risk; nothing in life is risk-free, and a public airing of some of the issues in this regard might help. The Government might be in a position to work with bodies such as the media in this respect. Certainly, the Government needs to ensure that the work of bodies such as its Advisory Committee on Releases to the Environment is better disseminated to the public. However, in doing so, it ought to adopt methods that are not perceived as talking down or lecturing people.

14. We would also not advocate organisations or even businesses with an interest in using GMOs being anything other than up front about the issues. Businesses in particular must deal with public perception all the time. “Perceptions are facts because people believe in them”, according to Epictetus (the Stoic philosopher of slave origin c. AD 55–135)—“Perceptions matter: why clients commission opinion research in the City”, Roger Stubbs, *Investor Relations Journal*, January 1997, pages 6–7. Businesses that totally ignore public perception of their products, their message and their image are highly unlikely to survive very well or very long. Even though people’s attitudes may change over time, businesses must still deal with public opinion as a matter of course. See *Public Perceptions of Business*, IoD Research Paper, Geraint Day and Ruth Lea, IoD, London, May 1998.

15. In the final analysis it is the outcomes that will matter:

“The government’s priorities are to protect people and the environment. But we must do so in ways that do not deny to people the healthcare, environmental and other benefits that flow from technological advances. That would be an abdication of the responsibility placed on government”. (Quoted from “Genetically modified food”, *Policy Analysis and Development*, Ministry of Agriculture, Fisheries and Foods, page 5, Labour Party, London, February 1999).

CONSUMER CHOICE

16. The operation of free markets is dependent on the availability of information. That process could in principle be served in the case of GMOs by appropriate labelling. Even in the presence of uncertainty of the environmental or health effects of GMOs, labelling of products containing GMOs is one way of assisting consumer choice. From September 1998 retailers in the EU have had to label products that contain GM maize or soya, and the UK has recently extended this requirement to include cafes and restaurants.

17. There is an unsatisfactory situation at present, whereby US resistance to segregation of GM soya from non-GM soya has led to some labelling that is fairly meaningless ("may contain" is not the most useful piece of information to consumers). The UK and EU would need to keep up pressure to try to persuade the US and its producers to have more sources of segregated product. Some retailers have themselves investigated such sourcing. The UK Government has produced a list of North American growers and distributors that supply non-GM soya to the UK. Seven European supermarket chains have set up a consortium to eliminate GM products from their own-label food products ("Supermarkets in move on modified food", John Willman, *Financial Times*, 18 March 1999). Given the importance and muscle of the big retailers, this sort of approach may be successful in changing the behaviour of suppliers via the market mechanism.

18. It is important to work towards detectability of GM ingredients as well as a meaningful form of labelling. The recent announcement of a test development by RHM Technology, that can apparently detect minute traces of GM soya and maize even in highly processed materials could be a step in the right direction ("Freeze! Gene police!", Andy Coghlan, *New Scientist*, 27 March 1999, page 4).

THE UNITED KINGDOM, EU AND WORLD AGREEMENTS

19. For the commercial production of GM food, we are aware that the EU clearance procedure which allows the UK to scrutinise applications from the other member states, and vice versa, may lead GM plants cleared in the UK to be denied marketing consents because of objections by other member states (*Genetically Modified Foods Benefits and Risks, Regulation and Public Acceptance*, POST, May 1998). There has been at least one case of this. The converse could apply in that GM products to which the UK has objected could still be made available in the UK. Such differences within the EU may be no different in principle from many other matters that are dealt with at EU level. However, given the importance of innovatory biotechnology and biological sciences to the UK's economic performance, it is still a real issue.

20. More significantly, it is the difference between the USA and the EU in that in the former, approved GM foods are treated no differently from traditional foods, whereas the EU is pursuing a regulatory and labelling course—in response to concerns about safety and taking account of public perception. World Trade Organisation rules must be an important factor in restricting EU or EU member states' opposition to GMOs.

21. The extent to which international free trade should respond to possible adverse environmental effects is not resolved. We note the recent breakdown of talks on a global protocol regulating international trade in GMOs, but also note that industry played an active part in preparatory meetings on biosafety ("Collapse of talks on safety of GMO trade", Ehsan Masood, *Nature*, Vol. 398, 4 March 1999, page 6).

22. To add to the difficulties, the USA has not been supportive of moves to include a protocol to the United Nations BioDiversity Convention, which is aimed at ensuring that GM plants and other organisms do not have an adverse effect on biodiversity.

23. Clearly, the issues are thorny, and will require firm approach by the UK and the EU if they wish to maintain their relatively cautious approach to the whole issue.

ARRANGEMENTS CONCERNING CIVIL LIABILITY FOR ENVIRONMENTAL DAMAGE

24. There are regulations in existence that already cover liability for environmental damage. It may not be particularly helpful for there to be specific arrangements that would encourage civil actions for alleged environmental damage arising from GMOs.

25. The Committee's question asked about arrangements for civil liability for any environmental damage caused by GMOs. We would also want to see highlighted the liberties of those carrying out legitimate scientific research, and business research and development. Thus the IoD will in no way condone wrecking activities, such as those recently carried out against a field of experimental genetically modified maize in Staverton ("Protesters are cleared over gene crop raid", Susie Steiner, *The Times*, 30 March 1999, page 14).

March 1999

APPENDIX 9

Memorandum from National Farmers' Union of England and Wales

GENETICALLY MODIFIED ORGANISMS AND THE ENVIRONMENT

1. INTRODUCTION

The NFU welcomes this opportunity to comment further on aspects of the biotechnology debate. Our key concern has been to ensure that the introduction of biotechnology into UK farming is controlled, and based upon a coherent set of rational policies to protect the environment and ensure food safety.

The NFU established a Biotechnology Working Group in January 1995 with the aims of developing an understanding of the issues surrounding biotechnology, their implications to agriculture and horticulture, and to make recommendations to the Council of the NFU on biotechnology policy. The initial policy document in this area was produced by the Working Group and accepted by the NFU Council in June 1995. A revised version of this document, which was accepted by the NFU Council in March 1998, is appended to this submission (Appendix 1). A brief summary and update of this document to include reference to the government's October 1998 announcements on biotechnology is also appended (Appendix 2). As can be appreciated the NFU policies in the area of biotechnology are still developing as new issues arise. Consequently, copies of two recent submissions made to government are also appended (Appendices 3, 4).¹

The NFU is also a member of the cross-industry body called SCIMAC (Supply Chain Initiative on Modified Agricultural Crops). Since its formation members have been working to guidelines for the use of farmers and growers who are intending to grow herbicide tolerant crops, plus other documents associated with such activities.

2. DEVELOPMENT OF A STRATEGY FOR ASSESSING AND MANAGING THE ENVIRONMENTAL IMPLICATIONS OF THE RELEASE OF GMOs

While there are still some concerns in certain quarters about the safety of foods that contain GM ingredients, particularly following several largely unsubstantiated food scares in the media, most competent commentators now recognise that the main area of concern relates to possible negative environmental effects of the commercial growing of GM crops in the UK.

The main concerns are that GM crops will out-cross with native flora to produce reproductively capable hybrids (so-called genetic pollution), or that the use of herbicide tolerant or pesticide-containing GM crops will have a negative effect on biodiversity such that there is a reduction in the range of organisms, including birds and mammals. The possible cumulative effects of the use of a range of GM crops also needs consideration. More specific negative effects on "useful" species such as ladybirds and bees have been reported in experimental situations. While studies of these topics in test plots suggest that the effects are unlikely to be significantly greater than those produced by conventional farming practices, and that they can be minimised by the use of appropriate agronomic practices, they certainly need further monitoring and consideration.

It should also be noted that growing GM crops may also prove beneficial to the environment. For example, it has been shown that substantially less herbicide is likely to be used with GM herbicide tolerant crops. There is also other evidence that the amount of pesticide has been greatly reduced by the use of pesticide-containing GM cotton in the United States. Another area where benefits could accrue are with non-food crops. Developments are under way to produce crops that can provide specialised oils or plastic feedstock chemicals, which would help to replace petro-chemicals. Other non-food crops are being developed so that they produce an increased bio-mass, which can be used for methanol production or other energy uses.

The change in emphasis to concern about the environment has been recognised by UK and EU authorities, and this has led to attempts to change the regulatory systems to take more account of these worries. The main change in the EU is an attempt to revise EC Directive 90/220/EEC on the deliberate release into the environment of GMOs. One proposed change is the introduction of a period of post-release monitoring. This change has been proposed for many years by the NFU as an additional safeguard against any unexpected environmental effects that were not identified by the more limiting growing area of test plots.

In the UK there have been several proposed changes that would relate to environmental concerns. The first is the expected establishment of an Environmental Stakeholder Forum. However, as has been pointed out by the NFU in an earlier submission, the terms of reference and the reporting structures of it will need to be clearly defined if the deliberations of the proposed new group are to be of value. In this respect we would suggest that the Forum should report to ACRE (Advisory Committee on Releases to the Environment) or to the newly established Ministerial Group on Biotechnology and Genetic Modification. The possibility that the Environmental Stakeholder Forum and new Ministerial Group would allow a more integrated approach to the consideration of over-arching questions on biotechnology and farming is welcomed by the NFU.

Another proposed change is that the upcoming revision of the membership of ACRE will be the opportunity to increase the environmental expertise of the group. The NFU believes that the members of ACRE should continue to be selected mainly on their relevant scientific expertise. Other proposed revisions would require a scientific review of pesticides to be used on GM crops, and a re-assessment of herbicides to be used on GM herbicide tolerant crops. The NFU considers that such changes are prudent in view of the changed use of the chemicals involved.

3. SCIMAC

The approach used in the UK to attempt to manage the introduction of GM crops into farming and growing has been through the development of industry codes of practice, which could then be approved by Government. This approach has the advantages of allowing regular review and rapid response to change. A voluntary agreement also avoids the possibility of legal complications between the UK and Europe that could result if the government had legislated in this area.

¹ Appendices not reproduced.

Two codes of practice were finalised within industry in April 1997. The first was produced by the NFU and was intended to establish a consistent approach to the provision of information to farmers and growers regarding GM crops (Appendix 5).¹ The second was produced jointly by the BSPB (British Society of Plant Breeders), the NFU, and UKASTA (United Kingdom Agricultural Supply Trade Association). A revised version of this latter code has recently been endorsed by SCIMAC (Appendix 6).¹ Both codes make the assumption that seeds and crops should be identity preserved, so that they can potentially be identified throughout the human and livestock food chains.

The informal group that produced the aforementioned codes of practice led to the formation of the cross-industry group SCIMAC, the formation of which was announced on 10 June 1998. Initial members of the group were the BAA (British Agrochemicals Association), the BSPB, the BSBSPA (British Sugar Beet Seed Producers Association), the NFU, and UKASTA. The main initial activity of this group has been the preparation of a set of guidelines for growing herbicide tolerant crops (Appendix 7),¹ together with associated documentary arrangements for ensuring compliance with the guidelines. This process involved discussions with Government, and with many other bodies such as English Nature, the Royal Society for the Protection of Birds, the Institute of Terrestrial Ecology, and the UK Register of Organic Standards. Detailed comments will not be made on the code of practice other than to note that it contains advice that should allow GM herbicide tolerant crops to be grown in a sensible and safe manner. Please refer to the code for details.

The arrangements that have been codified in the code of practice and other documents referred to in the previous paragraph, are to be used for the first time for the government-sponsored field-scale trials of GM herbicide tolerant crops that began in April of this year. This four year programme is part of the Government proposals for biotechnology made in October 1998. The field-scale trials are to be monitored for changes to biodiversity under a tendered independent contract. The components of this post-release monitoring programme were agreed by consultations between DETR, MAFF, SCIMAC, some of the other bodies mentioned in the previous paragraph, and companies who are providing the seed for the trials. Comparison will be made between non-GM and GM crops. Apart from obtaining information on the effect of growing GM crops, valuable information on the biodiversity of conventionally farmed fields should also be obtained. As was noted in a recent review of the likely impact of GM herbicide tolerant crops ("Scientific review of the impact of herbicide use on genetically modified crops", Pesticide Safety Directorate, 15 December 1998) there is relatively little information available on the effects of *any* farming practice on field biodiversity.

The NFU is concerned that eco-terrorists may target fields used in the aforementioned trials. Such activities could severely affect the scientific value of the field-scale trials, and could even make them worthless. If such an event should occur the NFU recommends that the policy of openness advocated by government, which allows detailed information on test field locations to be obtained, should be reviewed.

4. OTHER REGULATORY AND PUBLIC CONCERNS

As has already been noted in a previous document (Appendix 5) the changes suggested in the Government announcement of October 1998 address many of the concerns the NFU have about the regulatory process. For example, the formation of the Ministerial Group on Biotechnology and Genetic Modification, plus the Environmental Stakeholder Forum, largely address the proposal of the NFU that an over-arching committee be established to consider overall concerns of the introduction of biotechnological innovations into farming and growing. Hopefully, these new committees, plus the centralising function of the soon-to-be established Food Standards Agency, which is slated to take over the functions of the ACNFP, will increase the co-ordination of existing policy and regulation. These bodies should also provide the possibility of oversight, and influence over the development of GMOs. The revision of the membership and functions of ACRE, plus the functions of the new committees should allow a more wide-ranging assessment of the direct and indirect risks of the use of GM crops, including the cumulative impact of GMO releases over time.

While there is some evidence that certain GM crops will aid in the reduction in the applications of chemical substances aimed at reducing the weed, pest insect, fungal, bacterial, or virus levels, this can only be proved by a series of field-scale trials, coupled with a programme of post-release monitoring of biodiversity changes. The initial field-scale trials of GM herbicide tolerant crops began this year. Hopefully, in the future, similar trials will be used for other GM crops.

5. SEGREGATION, LABELLING, AND CONSUMER CHOICE

The widespread introduction of unsegregated imported GM soya and maize into the human and livestock food chain in the UK was the spur that alerted the British consumer to the advent of biotechnological innovation into food and farming. As food and feedstuffs were unlabelled the consumer had no effective way of avoiding eating food that contained GM ingredients. Consumer choice had been removed.

The EU and UK legislators have addressed these concerns by introducing labelling. The underlying assumption has been that foods only need to be labelled if they contain detectable novel DNA and/or protein. The NFU supports this approach. The EU regulations on Novel Foods and Novel Food Ingredients (Regulation

¹ Not reproduced.

258/97), and on labelling foods that contain Novartis's GM *Bt* maize or Monsanto's GM soya have been developed using these assumptions. The UK enactment of these regulations (The Novel Food Ingredients Regulations 1997, enacted 16 June 1997, and the Food Labelling (Amendment) Regulations 1999) followed the EU regulations *in toto*, except that catering establishments were additionally covered by the latter regulation.

As noted in a recent NFU submission (Appendix 8)¹ there are some practical difficulties with this approach.

- There needs to be an agreed *de minimus* level of novel DNA and/or protein, that when exceeded, initiate labelling. Recent reports suggest that the EU is centring on the idea of this level being 2 per cent, which is the same figure as that suggested in the recent House of Lords Report on the EC Regulation of Genetic Modification in Agriculture.
- Authorised, validated, reproducible methods for detecting novel DNA and protein will be needed to support the establishment of the *de minimus* level.
- Agreed sampling methods will need to be established.
- Studies will need to be undertaken to determine whether or not food processing methods differentially degrade novel DNA and/or proteins. If they do, this will mean that both novel DNA and protein testing will be needed for the determination of whether a foodstuff contains novel ingredients.

It should be noted that some consumers are not satisfied with the aforementioned basis for labelling. They argue that labelling should be based on whether material in food is derived from crops that are genetically modified *irrespective* of the presence or absence of novel DNA and/or protein. This approach is because such consumers object to the growing of GM crops and the environmental damage that they believe they cause. Some retailing chains have acceded to the requests of such consumers and are already labelling many more products than the law requires.

The NFU and SCIMAC codes of practice should ensure that identity preservation of GM crops grown in the UK will be attained. This identity preservation is what is required at the farm gate. If market forces are such that these crops are segregated throughout the food chain this would allow effective food labelling so that consumer choice can be preserved.

Identity preservation and segregation is practical on a small scale, and will for example be required for crops that produce specialised oils. However, because costly large scale structural changes to the distribution network would be needed to maintain segregation with commodity crops, it may never be undertaken unless there is extensive consumer demand for non-GM food.

6. THE INTERNATIONAL PERSPECTIVE

It seems unlikely that there will be early agreement between the EU and the USA on GM crops. The recent failure of the negotiations on the establishment of an international Biosafety Protocol, largely because of difficulties generated by the possible inclusion of commodity crops in the protocol, and opposition by the "Miami Group" (Argentina, Australia, Canada, Chile, Uruguay, and the USA), shows that international agreement in this area will be difficult. Another example is that of the Codex Alimentarius negotiations relating to draft recommendations for the labelling of foods obtained through biotechnology. While a list of items likely to cause hypersensitivity was accepted at a Codex meeting in May 1998, the overall labelling draft was not approved. Member States were divided between those who supported the draft proposals (Australia, Brazil, Canada, Mexico, New Zealand, Peru, and the USA), and those who wanted labelling *in more cases* (the EU, Hungary, India, Norway, Poland, Slovak Republic, and Switzerland). Another example is the conflict between the USA and Europe about the acceptability of using bovine growth hormone in farming.

In general one can say that there is a group of what one could call "minimalist" countries led by the USA, who want the minimum amount of regulation of biotechnology. In contrast there are others, including the EU, who have active antagonistic consumer groups, and want more regulation. It seems unlikely that these two groups will be reconciled in the near future, although the UK government and European legislators are urged to continue to try to obtain meaningful agreement. The upcoming WTO/GATT negotiations should provide another route to reach such agreements.

7. CIVIL LIABILITY

It is clear that the legal situation with regard to civil liability for any damage caused by GMOs has not been established. Numerous examples of these uncertainties have already been noted. The sorts of agreements that have been made between suppliers of seeds and farmers in the USA have led to many prosecutions, when the farmers in question have carried out the traditional practice of saving seed. In the cases that have come to court, it was clear that such a practice was not allowed under the agreement the farmers signed. It should be noted that the EC Directive for the legal protection of biotechnological inventions, if finally agreed (it is presently being challenged in the European Court of Justice by the Netherlands), contains a clause that allows the saving of seed. Consequently, the sorts of agreements used in the USA might not be acceptable in the EU. However,

¹ Not reproduced.

the use of contracts that do not allow seed to be saved will ultimately depend on the acceptability or otherwise of them by the UK and European farmers and growers.

The 1998 UK case that concerned the GM-free status of an organic farmer in Devon is an interesting one. An organic farmer unsuccessfully applied for a Judicial review to halt trials of a GM maize in fields adjacent to his farm. The action was taken because of the perceived danger of the cross-pollination of his organic sweet corn crop by the GM maize and the consequent threat to his organic accreditation. The common law tort of nuisance imposes liability where damaging weed seeds are allowed to escape onto neighbouring land. However, its application to GM crops has yet to be tested in the courts.

A successful prosecution of Monsanto and Perryfield Holdings for breaches of their consent orders to grow GM crops is an example of a case where the law was plainly broken. However, the recent collapse of a case against two environmental protestors who admitted destroying GM maize test plots last year, show that what appear to be political considerations sometimes interfere with the successful prosecution of eco-terrorists. Nevertheless, the Government has stated that is regrettable that the transparent and open regime that provides the locations of GM crop test sites has been abused by such eco-terrorists. The NFU would recommend that in future eco-terrorists be rigorously prosecuted if they break the law.

8. SUMMARY AND KEY POINTS

- The NFU supports the government proposals on biotechnology made in October 1998. However, it is thought that clear terms of reference and reporting systems will be needed for the Environmental Stakeholder Forum to be effective.
- The NFU advocates a system of voluntary codes of practice, approved by government, and backed up with effective sanctions, as the most effective way to manage the introduction of GM crops into UK farming and growing. The NFU supports the system that SCIMAC has produced for herbicide tolerant crops, and it is pleasing that it is to be used to manage the field-scale trials that have begun this year.
- The NFU fully supports the programme of field-scale trials of GM crops that the government have initiated.
- The NFU supports GM labelling regulations that are based on the presence or absence of novel DNA and/or protein. However, it is noted that several practical matters have to be addressed before such regulations can be effectively applied.
- It is thought unlikely that there will be agreement on an international regulatory framework for managing GM crops and their products in the near future. This is thought to be largely caused by the disparate views on the technology between North America and Europe. However, the government are urged to continue to try to obtain agreement because of the importance of doing so.
- It is considered that the potential legal ramifications of the introduction of GM crops into UK farming and growing have not yet been clearly defined. It is thought likely that case law will help to clarify matters in the future. There is particular concern that eco-terrorists have not generally been exposed to the consequences of their illegal actions via successful prosecution. The government are urged to try to ensure that the law is upheld in such cases.

April 1999

APPENDIX 10

Memorandum from the Natural Environment Research Council

INTRODUCTION

1. The Natural Environment Research Council (NERC) is the lead UK-wide organisation for basic, strategic and applied research and training across the spectrum of the environmental sciences. NERC's role is to support scientific research, survey and monitoring at universities and through its own Centres and Surveys: the British Antarctic Survey (BAS), the British Geological Survey (BGS), the Centre for Coastal and Marine Sciences (CCMS), the Centre for Ecology and Hydrology (CEH) and the Southampton Oceanography Centre (SOC—a joint venture with the University of Southampton).

2. Research related to genetically modified organisms and the environment is undertaken at institutes within CEH and supported by NERC at universities. NERC's experience of the operation of Government policy on the development and use of genetically modified organisms (GMOs) is mainly in the area relating to the release of genetically modified crops. NERC-funded scientists have provided much of the science underpinning current UK regulations on risk assessment.

3. NERC scientists are connected to the advisory system via individual membership of advisory committees and by consultation as technical witnesses and by commissioned research. The following members of NERC Council and senior staff are actively involved in the advisory system:

- Professor J E Beringer (Bristol University and Member of NERC Council)—Chairman of the Advisory Committee on Releases to the Environment (ACRE) and Member of the Advisory Committee on Genetic Modification (ACGM);
- Professor T M Roberts (Director of the Institute of Terrestrial Ecology (ITE, part of CEH) and Designate Director of CEH)—Member of ACGM;
- Professor A J Gray (ITE)—Member of ACRE;
- Dr J I Cooper (Institute of Virology and Environmental Microbiology (IVEM, part of CEH)—Member of the Technical Sub-Committee of ACGM.

4. This response draws on input provided by IVEM and ITE and comments from NERC Council members. Our evidence is structured around the first three questions identified by the Committee. We are unable to respond to the remaining questions covering issues of labelling, EU policy initiatives and civil liability, as these are outside the competence of NERC. We are also providing evidence to the House of Commons Science and Technology Committee Inquiry into the Scientific Advisory System: Genetically Modified Food.

NEED FOR A STRATEGY

5. Genetic modification of organisms can offer enormous benefits to medicine and agriculture. Biotechnology industries, based on genetic techniques, are developing rapidly across the world. While some of the likely, short-term impacts of GMOs on the environment are known, there is less certainty about long-term implications. There may be a question of balancing environmental impacts against benefits to society. There is a need for a strategy to ensure that advances in biotechnology are matched by progress in understanding, predicting and preventing any adverse environmental consequences. For GM crops, there is a continuing need for each crop and crop modification to be considered on a case-by-case basis. Large-scale, ecological field trials are needed and they must be of adequate design and duration.

MECHANISMS FOR DEVELOPING A STRATEGY

6. Present mechanisms for co-ordinating policy and regulation are based on a framework of advisory committees. The restricted remit of the individual advisory means that the framework for crop biotechnology is fragmented, though we do not believe that there is a significant problem of overlap between committees. Recently the Royal Society has called for an over-arching body to pull together the limited remits of the existing committees and take a more strategic view.

7. A major problem is that the technology is developing more rapidly than our ability to understand some of its implications, and certainly more rapidly than our ability to undertake the necessary, underpinning environmental research. Where our understanding of natural systems is imperfect an element of risk will always exist.

8. The recent release of herbicide-tolerant oilseed rape provides a good example of the weaknesses of current arrangements. ACRE assessed the risks to human health and the environment, including the transfer of the herbicide-tolerance genes to wild relatives. However, it was not able, or qualified, to make a judgment about the change in herbicide use and agronomic practice which might follow the release of the crop. Filling such knowledge gaps is probably best done by an over-arching body to ensure that there are overlaps in responsibility. While Environmental Stakeholder Forums (ESF) are very valuable for many issues, they tend to achieve compromise positions rather than getting to the heart of the issue. Alternatives include cross-membership by the chairpersons of the relevant advisory committees and a body working in parallel on judgments about changes in herbicide use and agronomic practice.

9. There may be room to simplify the current system, though the need for technical advice will remain. Other EU countries may have more simplified structures, but they may also have biotechnology industries less diverse than those in the UK.

10. The process by which Government obtains and uses scientific advice is an issue of increasing public and media interest. NERC supports the principles recently set out by the Government's Chief Scientific Adviser for the provision of scientific advice to Government (The Use of Scientific Advice in Policy Making, March 1997):

- (i) the process of gathering, assessing and reporting scientific advice should be open, transparent and consultative;
- (ii) it must be based on the best scientific expertise and evidence;
- (iii) advice must also highlight scientific uncertainties or divergencies in scientific opinion and knowledge.

11. From a scientific perspective most government departments maintain a close working relationship with the Research Councils and Science Base. NERC, for example, has concordat agreements with a number of departments, including: DETR, MAFF, DTI, the Scottish Office and Health Departments. Regular meetings involving scientists and departmental officials are arranged to brief both the department and NERC on scientific and policy issues of mutual interest.

MECHANISMS FOR INCORPORATING PUBLIC VIEWS

12. While it is unlikely that many of the public know, or care, about the existing systems, it is clear that a vocal section does not have confidence in them. It is also clear that the wider issue of public interest is not represented on the advisory committees. The problems are largely about people's perceptions of the problem, their moral, ethical and religious unease, and their inability, for whatever reason, to trust experts. Other sections of the public have confidence in the quality, value and independence of advisory committees, but less confidence in the political executive or in departmental positions where commercial interests conflict with scientific views. The perceived MAFF position at the outset of the debacle over BSE is likely to have a durable negative impact on public perceptions. If the public values are not known or understood, and generally they are not, then they should be sought.

13. Although ACGM is a little different from ACRE, each of the existing committees offers "technical" judgment on technical data and accepts that trade and political realities are outside their competence. It has been proposed that environmental/NGO stakeholders should have greater representation on the advisory committees. However, it may be better to have elected representatives, such as Members of Parliament, rather than self-selected quasi-independent individuals to complement technical experts. In our experience, the environmental stakeholders do have adequate influence. Indeed, there is a view that the UK is at a commercial disadvantage due to the influence currently exerted by environmental stakeholders.

14. EU legislation is expected increasingly to take on an ethical dimension and we support the principle of bringing ethical and social issues into the formal regulatory process. However, it is difficult to see how this can be done through the expert advisory committees. At present the coverage is patchy. Ethical issues are considered by the Advisory Committee on Novel Foods and Processes (ACNFP), for example, but not by ACRE although ACRE has appointed an independent social scientist.

15. NERC's experts in this field are all actively involved in communicating their science to the lay public as well as to government, decision makers and other scientists. It is important that researchers are trained in communication skills, although explaining science in more detail will not necessarily engender public confidence.

16. Many people do not accept that risk is acceptable where the risks are unknown or the understanding of them is imperfect. There is genuine concern over the impact of GMO releases on ecosystems and the wider environment. These are issues which do have to be acknowledged and addressed.

17. Public perception is coloured by the "large American corporation" status of the companies trying to establish GMOs in the UK. Scientists may not wish to become involved in this debate but, nevertheless, need to be mindful of public dislike of transnational corporations.

March 1999

APPENDIX 11

Memorandum from Novartis

GENETICALLY MODIFIED ORGANISMS AND THE ENVIRONMENT

INTRODUCTION

Novartis welcomes the opportunity to respond to the Environmental Audit Committee's inquiry into the development and use of genetically modified organisms (GMOs) in the light of the implications for environmental protection and conservation.

To date, Novartis experience of the current UK system dealing with GMOs and the environment relate to regulatory approval on:

- *Bt*-maize approved for importation, processing and cultivation in the European community. In the UK, *Bt*-maize is approved for import and use in human food and animal feed. Cultivation of the presently-approved *Bt*-maize strains is not envisaged in the UK, where the European corn borer, which *Bt*-maize has been modified to protect itself against, is not a pest of the crop.
- Development and trialling of herbicide-tolerant sugar beet.
- Development and trialling of genetically modified wheat.

The progress in recent years in the fields of molecular biology, plant physiology and genetics is of tremendous significance for the future of agriculture. The guiding principle of our agricultural research and development is to fully explore these new approaches for the benefit of our customers, the public and the environment and to harness progress for the benefits of society as a whole.

We welcome the opportunity for more openness and balance in discussing GMOs in the light of the implications for environmental protection and conservation. We recognise there are concerns, whether real or

perceived, regarding this technology which must be addressed. Government's priorities include protection of the environment through a system of rigorous assessment and regulation. The Environmental Audit Committee's terms of reference provide a further opportunity to shed more light on the debate.

The Supply Chain Initiative on Modified Agricultural Crops (SCIMAC) has developed proposals, with MAFF, DETR and English Nature, for a code of practice and guidelines for the managed development of GM crops. In addition, an initiative between MAFF, DETR and SCIMAC, in collaboration with English Nature and the RSPB, has been developed to monitor and measure the ecological and biodiversity impact of GM crops in comparison with non-GM crops in farm scale trials. At the time of this submission, no Government ratification of these trials has occurred but a decision is expected imminently.

This initiative will we believe deliver an independent and transparent assessment of the impact if GM crops on farmland biodiversity which will provide both generic and case-by-case data for the currently available and future GM crop products.

1. *Is there a need to develop a strategy for assessing and managing the environmental implications of the release of GMOs?*

1.1 The Government can only reach an overall evaluation of the positive and negative impact of GMOs if there is a baseline understanding and inventory of the current impact of human activity. At the moment there are no standards for comparative assessment of environmental and biodiversity impact arising from the use of GMOs vs current commercial farm practices. Farming activity *per se* has had a profound influence on biodiversity in the UK, and new practices have to be compared with the presently dominating form(s) of agriculture to assess their impact. Without comparative figures we risk rejecting methodologies that go a long way in making our agriculture more environmentally sustainable.

1.2 The lack of a clearly defined strategy of this kind is hindering the assessment of new technologies in the framework of societal priorities. We live in a situation where it is repeatedly clearly stated "what we don't want", but not "what we want". As a result, there is no clear long-term framework in which to assess the environmental opportunities and potential problems involved in the introduction of new technology, including GMOs. What industry requires is enabling regulation rather than disabling regulation.

1.3 The UK and Europe therefore needs to set an overall framework for biosafety and environmental standards, in order to ensure that all agricultural practices, not just those stemming from GM technology, would be assessed against the long-term priorities set by European society.

1.4 Regulation of GMOs can only be fair, transparent and efficient if there are clear standards for measuring the performance of the product. The system should therefore include an overall evaluation of a GM crop's environmental impact, covering potential benefits alongside its risks.

1.5 The joint Government and SCIMAC Biodiversity Initiative has been designed to assess and compare the impact of GM crops with non GM crops in terms of biodiversity and UK farmland wildlife. The initiative will answer the very environmental impact questions being asked about the technology with a non-GM commercial crop benchmark for comparison.

1.6 In the UK, herbicide-tolerant GM varieties are closest to commercialisation in oilseed rape, maize, fodder beet, and sugar beet. Conventional varieties of all these crops are already resistant to herbicides presently used in their cultivation. In fact, most traditional herbicides have to be innocuous to the crop, and have been selected on that basis. Currently every hectare of these conventional crops is treated with a programme of such herbicides, which in most cases achieves very high levels of weed control across a broad spectrum of weeds in order to remove weed competition and prevent yield loss. GM herbicide-tolerant crops introduce no new properties which do not or could not exist in crops bred through conventional means. There is therefore no basis to suggest that GM crops will impact negatively on biodiversity compared with current practice.

1.7 However, there are clear indications that, with effective management, herbicide-tolerant GM crops offer potential benefits for the farmland environment. They allow the use of herbicides that are particularly non-toxic and have short residue times in the environment, thereby strongly reducing residue problems in soil and surface waters. Because they allow the farmer to use herbicides only when needed, they have proven to lead a reduction in herbicide use (herbicides are expensive, and farmers have a strong incentive to use them sparingly). Currently, herbicide practices with all UK crops are determined by the flexibility of weed size that can be controlled.

1.8 Such highly desirable innovations are not at present judged for these benefits, because the present system of GMO evaluation is purely risk based. There is no room in the present system for an overall comparative evaluation of such "agricultural systems". From the viewpoint of environment protection, a move back to *environmental impact assessment* of new crop protection systems compared to conventional practices is much more productive than the present fragmented reductionist approach, which is essentially trying to prove a "zero risk", something that no science can do.

1.9 There is a lot of confusion about the way in which one should evaluate the contribution to biodiversity damage of agricultural practices. For example, in its Communication: "Directions towards sustainable

agriculture" (COM(1999)22final), the European Commission confuses the issues of *effectiveness and pollution* (page 9, article 2.1.1). The Commission implies that a more effective crop protection product is automatically a more polluting one. In fact:

Effectiveness is a measure that we can define as wanted by our policies. It has traditionally been defined narrowly as the capacity to protect the crop from its competitors and enemies, which would reduce yield or crop quality, without much regard to the side effects. There is nothing that stops authorities from including environmental considerations in the definition of effectiveness.

Pollution is a measure of the unwanted effects on the environment.

In the development of a long-term strategy for a more environment-friendly agriculture, authorities have the opportunity to redefine the standards of cropping systems so that innovation can be directed towards a better compromise between effectiveness and pollution. The combination of GM plants and low impact herbicides is a particularly strong move in that direction.

2. *Does the Government have adequate mechanisms for developing such a strategy in terms of:*

— *the co-ordination of existing policy and regulation*

2.1 Novartis hopes that the Government's newly established Cabinet Committee on Biotechnology will provide the mechanisms for the co-ordination of existing policy and regulation.

— *oversight of, and influence over, the direction of development of GMOs*

2.2 We believe that the Government does have sufficient mechanisms for the oversight and influence over the direction of the development of GMOs.

2.3 However, influence over the future development of GMOs should not simply revolve around the technology *per se* but should be rooted within a broader base of environmental objectives, e.g., the protection of on-farm biodiversity by the reduction of toxic residue arising from crop protection programmes. Every technology, whether genetic modification or not, should then be considered in terms of its contribution to meeting these overall objectives.

2.4 Influence can be exerted through bodies such as the Biological and Biotechnological Sciences Research Council (BBSRC) and funding to the UK's plant technology and agricultural research institutions, of which the UK has several of the world leaders. These public research institutions also provide the expertise to ensure that the scientific assessment is of the best international level.

— *the assessment of direct and indirect risks, including the cumulative impact of GMO releases over time?*

2.5 NGOs have categorically failed to find any detrimental effects of GMOs and have therefore focused on long-term cumulative impact, based on presumption not actual scientific evidence.

2.6 Europe could benefit from the experience of the USA where monitoring programmes are in place. The debate in Europe tends to overlook the fact that there are several intensive monitoring research programmes in place with different types of GM crops and traits. With regard to biodiversity impact, the results from these studies will be directly relevant to UK decision making. To study the long-term impact of GMOs, monitoring is key but a long-term monitoring programme is virtually impossible to model.

2.7 A model in successful product monitoring can be seen in pharmaceutical regulation. The UK's Committee on the Safety of Medicines (CSM) has a rigorous system for post-approval monitoring of the adverse reactions of licensed pharmaceutical products. In general, the regulatory authorities give approval on a product based on the scientific evidence available at that time in the knowledge that all risks associated with the product are impossible to predict but the monitoring mechanism will pick up adverse reactions.

2.8 At the moment an informal networking system exists in the seed sector which alerts farmers, Government and company representatives to changes in disease/pest resistance in traditional seed varieties.

2.9 A similar system of systematic monitoring could prove highly effective in the regulation of GM crops and could assist in measuring long term risks and cumulative impact of GMOs on the environment. If that is done, it would again be preferable, from a biodiversity perspective, to extend this monitoring to *all new introductions*. Much of the present concern on biodiversity effects of GMOs is based on extrapolation from known problems with *exotics*. While there is still not a single case where this extrapolation has proven justified, it should be remarked that very little is done to use our extensive experience with *exotics* to better monitor new exotic introductions. Strategic monitoring programmes for all new introductions would seem to be the correct response to such concerns.

2.10 A case in point is the reference to so-called superweeds. This spectre is repeatedly raised with reference to herbicide tolerant and insect resistant crops. Yet there is not a single case of a crop turning into a superweed.

All the destructive weeds known are either seeds of wild plants introduced in a new environment by accident, or ornamentals shipped to new environments.

— *the contribution that GMOs might make to more sustainable agriculture?*

2.11 Novartis, and other biotechnology companies, recognised as far back as twenty years ago that the agricultural processes of that time would break down or become inappropriate. We therefore focused research on finding alternative approaches to ensuring sustainable agriculture.

2.12 This research led to the development of GMOs as one potential alternative. GMOs have been shown to play a vital role in agriculture and that they will be able to contribute greatly to ensuring more sustainable agriculture in the future.

2.13 GMOs are just one of many manifestations of the follow-through of the expansion in our knowledge of the living world into economic reality. They are the principal tool through which we are trying to reduce the reliance of agriculture on non-sustainable resources (such as overuse of pesticides and fertilizers, mechanical weeding) and replace them with biological knowledge, packaged in the seed.

3. *What mechanisms exist, or are needed, for incorporating public values and concerns regarding the environmental implications of GMOs, alongside the results of scientific assessment within the decision-making process?*

3.1 Novartis welcomes a clear, transparent and science-based regulatory framework in the UK, compatible with international legislation. Such regulation protecting and promoting public health and protecting the environment is an essential element of successful scientific development.

3.2 It is clear that public values and concerns need to be considered. However, in regulatory terms, as enshrined in the Treaty of Rome, it is good practice to ensure that these issues are quite clearly distinguished from the scientific regulation of a product.

3.3 We fully welcome the public's viewpoints being considered but we query whether these broader questions should be considered in the current mechanism, which deals essentially with scientific risk assessment on a case-by-case basis.

3.4 An overarching body has been proposed as the most appropriate platform for such views. We believe there is value in an overarching body where public values and concerns are taken into account. This would ensure a clear distinction between ethical consumer issues and scientific safety evaluation and risk assessment and would facilitate effective communication of the process to the public.

4. *What is feasible and desirable in terms of preserving customer choice by segregation and labelling—particularly the issue of “labelling for process” to provide for consumer influence over the use of GMOs and their implications?*

4.1 Novartis supports consumer choice and the right of the consumer to decide whether or not to purchase products containing GMOs.

4.2 Novartis' policy is to clearly label all GM seeds that it develops and markets to ensure that any subsequent identification which is required by legislation or consumer demand can be effective. We support all practical steps within our control that can contribute to this process by liaison with the media and the Government.

4.3 There are tests to check for foods labelled as containing GMOs, providing consistent thresholds are agreed.

4.4 It will be far more difficult to police and avoid fraud in foods “labelled for process”, which contain ingredients derived from GM crops e.g., oils. There are no detection methods for these derivatives from GM crops, where the DNA has been processed out. Without any detection method, verification of GM-free claims will be virtually impossible.

4.5 Interested parties could consider the creation of a certified, tightly contained GMO-free circuit, covering growers, food manufacturers and processors and retailers. In order to gain this certification, the crop would be grown and food manufactured under such strict controls that would ensure that authorities would be completely confident that the GM-free label was accurate. In this closed-loop integration, traceability and identity preservation would need to be guaranteed. With the increasing uptake of GM crops, food certified as GM-free will be increasingly expensive to procure and certify and would incur a significant price differential.

5. *What scope does the UK and EU have for policy initiatives, and what are the prospects for multilateral agreement, on the release of GMOs into the environment—with particular reference to the World Trade Organisation and GATT disciplines and obligations?*

5.1 There is a great need for more international harmonisation of the regulatory policies on GMOs (as indeed for all of agriculture). The OECD has done most of the groundwork to ensure that regulations in its member states are based on sound science. In the present climate of controversy and confusion between safety issues and other societal issues this work is at risk of being forgotten.

5.2 GMOs have been prominently present in WTO negotiations and in the Biodiversity Convention. The recent failure to agree on a *Biosafety Protocol* has highlighted the confusion between safety issues and other (socio-economic, ethical, trade) concerns of many countries.

5.3 There is scope for an international initiative that essentially retraces the steps of the intensive policy reflection presently going on in the UK (e.g., House of Lords report; Science and Technology Committee case study) and leads to a proper identification of the different issues and opportunities raised by biotechnology (indeed by the life sciences in general), and the development of appropriate responses to each of them, with some forum where there can be co-ordinated thought about the overall picture.

6. *Are there adequate arrangements for civil liability for environmental damage caused by GMOs?*

6.1 Novartis has a 30 year product liability cover on all biotechnology products, provided that the burden of proof rests with claimant alleging damage. We believe in the safety of our products and product liability is a demonstration of our commitment to safe products.

6.2 In current discussions about potential environmental damage and liability, the burden of proof has shifted. There has been much speculation about potential environmental damage from GMOs but no group has been able to give any evidence for this potential damage. However, biotechnology companies are expected to demonstrate that their products are entirely risk-free.

6.3 The Committee may wish to consider the EU Directive currently being prepared on environmental damage. We understand that this directive will set common standards for what constitutes environmental damage and how it will be measured. This legislation will cover all sectors and industries.

6.4 We do not believe that the UK should not single out the environmental effects of GMOs as unique for civil liability. The Government needs to determine overall what constitutes environmental damage and then make arrangements for civil liability on that basis.

In summary, it is essential that the Government sets an overall framework for biosafety and environmental standards to assess the impact of all agricultural practices and not just those stemming from GM technology. This work needs to take into account discussions at an EU level on the revision of Directive 90/220.

Authorities should make a comparative assessment of the environmental and biodiversity impact of current commercial farming practices of conventional crops with GM technology. The debate should move on from the "zero risk" demands of some groups to making a comparison with present practices.

Such a framework coupled with an appropriate consideration of public values and concerns should help prevent society rejecting a technology that will help to make agriculture more environmentally sustainable.

March 1999

APPENDIX 12

Memorandum from the Royal Institute of Chartered Surveyors (RICS)

INTRODUCTION

This evidence has been prepared by The Royal Institution of Chartered Surveyors (RICS) which has over 100,000 members around the world. Our members are involved in some capacity with the management of the majority of rural and agricultural land in the United Kingdom. They represent the interests of private, public and corporate landowners as well as tenants. In addition, they work for many public bodies such as English Nature, the Ministry of Agriculture, Fisheries and Food and the Countryside Council for Wales. The RICS is, therefore, well placed to advise on the land management implications of the commercial introduction of genetically modified crops.

The increasing development of biotechnology and, in particular, genetically modified crops (GM), may have significant implications for the way the countryside is managed. We explore some of these implications below.

Separating GM and GM-free crops

The cases of *Regina v Ministry of Agriculture, Fisheries and Food ex parte Watson* and *Health and Safety Executive v Monsanto and Perryfield Holdings* have already highlighted the problems of trying to separate genetically modified and organic crops. There are many other farmers who, whilst not practising organic farming methods, nonetheless wish to remain GM-free. The key problem that they may face is that their crops could be affected by cross-pollination from GM crops grown on neighbouring land or any other land in the vicinity. It must be remembered that cross-pollination can occur from a distance of as much as 2 kilometres.

Cross-pollination could destroy the organic or GM-free status of a farm. As many consumers and major supermarket chains are keen to buy or market GM-free food the loss of GM-free status could have adverse financial consequences.

Moreover, once GM crops have been grown on a farm, inherited modified genetic sequences in crop volunteers and related weed species may persist even after the crop has been harvested and sold. It may be that once GM crops have been grown on a farm, GM-free status will be lost for ever. There may also be problems associated with cross delivery of seed and mixture of seed or harvested products through failure to effectively clean equipment such as harvesters and seed drills.

Given the Government's commitment to introduce clear labelling of GM crops there are many questions that need to be addressed, including:

- Would growers be allowed to grow non-GM crops on land on which GM crops have been grown or are growing?
- Would the crops be certified as non GM if there are GM crops growing on adjoining land or indeed in the locality where there is a risk of cross-pollination or movement of seed?
- What procedures would be written into any regulations to ensure that non GM and GM crops are handled separately in the field, in store and when being processed?

The only way to meet the concerns raised by such questions would be a strict regulatory regime. The operation of such regulations would be a considerable task, but it is crucial that safeguards are put in place to ensure the continued demand for British produced food. The BSE crisis demonstrated how the lack of adequate records can hamper the industry's attempt to win back consumer confidence.

Legal Claims against Growers

If cross-pollination or the appearance of seeds from GM crops did occur, it may result in substantial claims for loss of crop against the person cultivating GM crops. Those growing GM crops would, therefore, need to examine their insurance policies to check that financial loss is covered. Should GM crops become classed as a pollutant in the future, the public liability pollution or contamination sections of insurance policies would also need to be examined. Most policies provide cover for pollution/contamination caused by a sudden and identifiable, unintended and unexpected incident which takes place, in its entirety, at a specific time during the period of insurance. The situation in respect of any contamination by GM crops through cross pollination would not take place in a specific incident, but over a period of time. A farmer or grower facing a claim from his neighbour for GM pollution leading to loss of non-GM or organic status, markets, contracts and so on may find he is not covered.

Implications for Bio-diversity

English Nature (EN) has noted in its position statement on genetically modified organisms that research carried out to date has not seen benefits to farmland wildlife. Where commercial releases are proposed. EN is therefore advocating the precautionary principle. From a land management point of view the RICS advocates the same principle. There is wide acknowledgement that the maintenance of bio-diversity is a highly desirable objective. Internationally, governments have been working together to promote national policies to achieve this goal. Research to date into GM cropping does not show any benefits for bio-diversity, and the farmer or grower considering planting GM crops needs to be made aware of the potential risk to wildlife. For example, it could have an impact on the number and type of insects thereby affecting wild and game birds; that could in turn affect the sporting potential of land.

Maintaining the biological diversity of, for example, field margins under the Countryside Stewardship schemes may be difficult if an occupier is growing GM crops. This might in future prevent the occupiers from obtaining new grant aid or fulfilling the conditions of an existing scheme. If an occupier grows GM crops next to a site of special scientific interest (SSSI) and cross pollination occurs between the GM crop and wild relatives growing in the SSSI would English Nature class this as a potentially damaging operation? Clients considering planting GM crops should be aware of the potential risks of this if they have an SSSI on or adjoining their land, where this could occur.

A register of GM Land

In light of the concerns set out in this paper we believe it is essential that the Government maintains a register of all land used for GM crops should their commercial release be sanctioned. This could be developed from the existing register held by the government for GM trials sites. Such a register would enable a person to check whether GM crops had previously been grown on land that he was now farming or in the vicinity of that land. It would also enable a prospective buyer of land to check whether land had been used for GM crops.

The information on a register should include, *inter alia*, the location of the crop, the type of the crop, the nature of the modification and dates of sowing. The register should be publicly and readily available free of charge and maintained by the Government or a public body.

The Sewage Sludge Regulations require water companies to maintain a register of all land used for the disposal of sewage sludge. In view of the environmental and health concerns of GM crops our calls for a register are consistent with the present sewage sludge regulations.

Landlord and tenant matters

The growth of GM crops on tenanted holdings may unknowingly result in a breach of the rules of good husbandry. This may lead to landlords registering a claim for dilapidations against the tenant, and may lead to a fundamental breach of covenant, giving rise to a notice to quit. However, the tenant may resist this claim, saying that there is no proven harm, and he could argue a case for "high farming", although this may be difficult to sustain if the market is demanding non-GM crops. Members of the RICS who advise tenant farmers, growers and landlords are advised to point this out to their clients. Written approval of a landlord for a tenant to grow GM crops is also advised before planting of GM crops. In addition, the RICS advises the insertion of a specific clause relating to GM cropping in all new tenancy agreements for the letting of agricultural land.

Valuations of Land

When conducting valuations of land, surveyors will need to look at whether the holding has a history of GM cropping, or whether GM crops have been grown on other holdings in the vicinity. A public register would enable these questions to be answered. From a professional indemnity point of view, clients will expect surveyors to highlight GM issues, and the RICS is considering inclusion of GM cropping on the checklist of matters to be taken into account in making a "Red Book" (the leading professional guide to valuation practice) valuation. Assessment of the way that the GM food issue affects the market for crops and land may affect farm trading accounts and their balance sheets. RICS members are advised to keep abreast of the news in respect of these crops, so they can inform their clients accordingly. Clients are being advised to inform any mortgagees or other lenders before planting GM crops.

RICS Survey of Members

An initial survey of members who represent the 25 local branches of the RICS Rural Practice Division has been undertaken and the comments made in this document include the results of the survey. The RICS will shortly be carrying out a further survey of some 300 Rural Practice chartered surveying firms to glean their views on issues such as:

- whether they feel they have sufficient access to information about GM crops;
- whether their clients are growing trial GM crops at present and if they have been consulted before sowing;
- whether they would advise landlords to allow tenants to grow GM crops;
- whether they feel growing GM crops on land or neighbouring land will affect value or saleability;
- if they consider the Supply Chain Initiative for Modified Agricultural Crops (SCIMAC) guidelines for GM crop management are practical and desirable.

We hope to have the results of this survey before the end of April.

April 1999

APPENDIX 13

Memorandum from the Royal Society for the Protection of Birds

SUMMARY

In the UK farmland has a multi-functional role. It not only provides us with food, but also jobs in rural areas, attractive landscapes and habitats for wildlife. However, the wildlife of farmland is in steep decline and its landscape value has deteriorated over the past 50 years. Research shows that the intensification of agricultural practice is mostly to blame.

The RSPB is concerned about GM crops for two main reasons: the possible effects of GM crops themselves on the farm ecosystem; and the possible ecological effects of changes in farming practice (further intensification) brought about by the introduction of GM crops. (In this respect GM crops are not significantly different from other technologies used in farming.)

RECOMMENDATIONS

- The RSPB calls for an “over-arching” body to be formed to consider a strategy for assessing and managing the environmental implications of the release of GMOs.
- The RSPB calls on the UK government to produce a clear strategy for supporting and enhancing the “multi-functional farming system”.
- Government must ensure that the GMO regulatory process fully assesses all potential impacts on the environment in order to influence the way industry develops GM crops.
- Government should make field-scale trials which examine the wider impacts of a GM crop on wildlife and the environment a mandatory part of the regulatory process before the crop can be considered for commercial approval.
- The RSPB supports the development of a Stakeholders Forum proposed by the government, but there must be a mechanism for incorporating the conclusions of the forum into government policy.
- The RSPB calls for a moratorium on the commercial use of genetically modified crops until the Government’s field-scale trials looking into the impacts of herbicide tolerant crops on wildlife are complete.

INTRODUCTION

1. RSPB welcomes the opportunity to give evidence to the Environmental Audit Committee inquiry into Genetically Modified Organisms and the Environment. A description of the RSPB’s position on GM crops (paragraphs 1–14) is followed by responses to the questions posed in the inquiry (paragraph 15 onwards).

2. The RSPB is the charity which takes action for the conservation of wild birds and their environment; we are the UK partner of Bird Life International—a global partnership of conservation bodies with the same aims. The RSPB is Europe’s largest wildlife conservation charity with over 1 million members and we rely almost entirely on the support of our membership to finance our conservation work. We manage one of the largest conservation estates in the UK with 147 nature reserves totalling more than 100,000 hectares.

3. The RSPB in the UK and Europe (as part of Bird Life International) works towards better understanding of the ecological relationships between species and habitats and land management, and the economic dimension of these relationships. We promote constructive ideas for integrating the environment into agriculture policy.

The role of farming and problems in the countryside

4. *The multi-functional role of farming.* Farming in the UK, and most of Europe, is not simply about the production of food. It also provides highly biodiverse habitats, attractive landscapes and jobs for the rural community.

5. *Farmland biodiversity and its decline.* In some cases farmland habitats are more biodiverse than the “Natural” habitats that they replaced. However, the biodiversity of farmland has been in massive decline in recent years.

6. *Declines of farmland birds.* Detailed monitoring of birds in the UK by the British Trust for Ornithology (BTO) has produced data showing that many farmland birds have declined dramatically over the past 25 years.

*Declining Breeding Bird Population Trends 1972–96
from the BTO/JNCC Common Birds Census (all these
species appear in the UK Biodiversity Action Plan)*

Species	Percentage decline
Grey partridge	78
Turtle dove	85
Skylark	75
Song thrush	66
Tree sparrow	76
Linnet	40
Reed bunting	40
Corn bunting	74

7. *Declines in other farmland biodiversity.* There have been serious declines in both numbers and diversity of insects on arable land. The Game Conservancy Trust recorded a 4.2 per cent. decline per year in 700 species of cereal arthropods between 1972 and 1990, and nearly 50 per cent. of species of wild bee are under threat. Broad leaved plants of arable land have also dramatically declined in the past 40 years. Indeed a few species,

such as corncockle and thoro-wax, are no longer found in the wild in the UK. Mammals such as brown hare and pipistrelle bat have also significantly declined.

8. *Deterioration of the farmed landscape.* Alongside the decline of biodiversity on farmland, and in some cases the cause of the declines, has been the destruction of the traditional farming landscape. There has been well documented evidence of the loss of hedgerows, over-wintered stubble fields, traditional farm buildings, crop rotations, hay meadows, grassland in the east of England and crops in the west.

9. *Causes of the decline.* Scientific research, by RSPB and many others, has shown that the declines in farmland biodiversity are mostly due to the intensification of farming practice. For example, the widespread use of herbicides and insecticides on farmland has, by reducing the amount of food available to the chicks, caused the decline of the grey partridge.¹ Intensification of farming practice is also seen as being partly responsible for the degradation of the farm landscape.

RSPB concerns about GM crops

10. Research and monitoring over a number of years have demonstrated the severely negative impact of modern farming on the agricultural ecosystem, especially on bird populations. Based on this evidence, the RSPB is deeply concerned that the development of genetically modified (GM) crops could exacerbate current trends.

11. The RSPB is concerned about two main aspects of genetically modified (GM) crops:

12. *The possible effects of GM crops themselves on the farm ecosystem.* For example:

- the insecticide in insect resistant crops may kill non-target insect species, thus breaking down the wildlife food chain;
- gene transfer may take place between GM crops and related native species, producing hybrids which could damage wildlife habitats if they were to displace other plant species; alternatively, traits such as insect resistance could lead to damage to ecosystems if they were transferred into wild plant species;
- GM crops might become agricultural weeds themselves and then invade other wildlife habitats.

13. *The possible ecological effects of changes in farming practice brought about by the introduction of GM crops.* (In this respect GM crops are not different from other technologies used in farming such as pesticides or ploughs.) for example:

- use of broad-spectrum herbicides on herbicide-tolerant (HT) crops could reduce weed populations and disrupt the wildlife food chain;
- crop resistance to pests and diseases may lead to changes to cropping patterns and loss of rotations (in general the greater the variety of crops in the rotation, the greater the variety of weeds and insects and, therefore, birds);
- novel traits, (such as frost or salt tolerance) inserted into crops may allow them to be grown in previously uncropped areas which may be important for wildlife (for example, uplands or estuaries).

RSPB recommendations to address our concerns

14. As a result of these concerns, the RSPB is calling for:

- The current regulatory process to be updated, as it does not adequately assess the impacts of GM crops on wildlife and the environment (particularly the impacts that may result from changing farming practice).
- A moratorium on the commercial use of genetically modified crops until the Government's field-scale trials looking into the impacts of herbicide tolerant crops on wildlife are complete.
- All future crops to be tested for their impacts on wildlife and the environment before commercial release is considered. Any crops that have an adverse effect on wildlife should be banned from use in the UK.

RESPONSES TO QUESTIONS POSED BY THE ENVIRONMENTAL AUDIT COMMITTEE

Is there a need to develop a strategy for assessing and managing the environmental implications of the release of GMOs?

15. The RSPB believes that it is necessary to develop a strategy for assessing and managing the environmental implications of the release of GMOs. We believe that the use of GM crops *could* exacerbate the current declines in wildlife on farmland.

16. Any strategy should set the general direction for the role of GM crops in multi-functional agriculture,

¹ Potts, G R 1986. *The partridge: pesticides, predation and conservation*. London, Collins.

defining which impacts will and will not be acceptable. The RSPB and English Nature have regularly criticised the GMO regulatory process for not taking such a strategic overview.

17. Whilst the RSPB would support the development of such a strategy for GM crops, we believe that until wider strategic thinking about the future of farming as a whole takes place it is unlikely to be effective (please see point 22 below).

Should this strategy include the formal assessment of the environmental benefits of GMOs alongside their risks?

18. One would expect that a strategy for assessing the “environmental implications” of a GMO would record both positive and negative aspects. However, it would be important to define the level and type of negative environmental impacts too severe to be offset by any benefit.

19. The RSPB has no ethical objections to the development of GMOs. It is possible that GMOs could be developed in a way that could benefit the environment. We are concerned, however, that the initial development of GM crops, despite having some possible or potential environmental benefits, may have an overall negative environmental impact. For example, herbicide tolerant (HT) crops could potentially reduce the amount of herbicides applied to a crop. The herbicides applied also have lower toxicity to humans and some wildlife. However, HT crops have been developed to reduce weed burdens and therefore increase crop yields. The chemicals used to do this are highly toxic to plants. Reducing weed populations impacts on biodiversity by breaking down the food chain for wildlife.

If so does the Government have adequate mechanisms for developing such a strategy, in terms of: the co-ordination of existing policy and regulation?

20. The RSPB is concerned that there is no body or committee in place to develop such a strategy. *For this reason RSPB has joined English Nature, the House of Lords European Communities Sub Committee D (in their recent inquiry into the regulation of biotechnology in Europe) and the Royal Society in calling for a new “over-arching” body to be formed to consider these strategic issues.*

21. Such an over-arching body would comprise experts in the fields of biodiversity and conservation, agriculture, food, human and animal health and the retail industry; and there should also be a consumer representative. The over-arching body should act as a filter for deciding whether certain GM technologies and crops are acceptable, and whether they should pass on to the other committees for further development and commercial approval. In addition to a broad strategy for GM crops, including assessment of environmental impacts at a strategic level, it is equally important that the likely impacts of individual crops be assessed at a more local level.

22. However, we are concerned that even if the over-arching body was in place any strategy they developed may be ineffective in the absence of a strategic policy for the overall direction of farming. The recent decline in farmland birds has resulted largely from the intensification of farming practice due to changing Government policy following World War II. The 1947 Agriculture Act required farmers to increase food production to prevent the food shortages that had occurred as a result of the war from happening again. The UK’s subsequent accession to the European Economic Community and then European Union (EU) and adoption of the Common Agricultural Policy (CAP) fuelled the intensification of farming.

23. In addition to the overarching problem of an anachronistic and harmful emphasis on production, UK government and European Union policies on agriculture, wildlife and landscape protection are also piecemeal. Individual policies often refer to the need for a multi-functional farming system (one that produces food, wildlife, attractive landscapes and jobs for rural communities) but overall policies fail to reflect this. For example, just 3 per cent. of CAP spending goes to environmental objectives. The current round of CAP reform has almost completely failed to address this problem.

24. A third problem is that individual agriculture policies sometimes work against one another. For example, the UK government has targets to reduce pesticide use, but an ADAS study has shown that the outcome of the current round of CAP reform is likely to encourage farmers to use more pesticides on their crops.¹

25. A casualty of this strategic incoherence, and one that is of paramount importance to the RSPB is the UK Biodiversity Action Plan, which the Government signed up to in 1992. This highlights the most threatened wildlife species and habitats, describes their current status and offers information on how to reverse the problems and achieve measurable targets. On the whole, however, targets are not being met for farmland species, mainly because European and UK farming policies work against achieving such goals.

26. *Until the UK government (and the EU) produces a clear strategy for supporting and enhancing the “multi-functional farming system”, then a strategy for the assessment and management of the environmental impacts of GMOs will have great difficulty in having a tangible influence on protecting the environment. To*

¹ CAP Reform: Potential for effects on environmental impacts of farming, ADAS and Central Science Laboratory, January 1999. Contact James Clarke, ADAS Boxworth, Boxworth, Cambridge CB3 8NN. 01954 268219.

give one simple example, even if a GM crop could be used to benefit the environment, if in benefiting the environment the yield of the crop were reduced, the average farmer would not use it in that way because it would reduce profits.

If so does the Government have adequate mechanisms for developing such a strategy, in terms of: oversight of, and influence over, the direction of development of GMOs?

27. Government has a major influence over the direction and development of GMOs. However current policy, as highlighted above, is still too focused on crop production. This sends clear messages to the developers of technology, plant breeders, researchers and farming advisors. In the case of the biotechnology industry, the initial modifications of crops are aimed mainly at increasing yields, even though the technology may have the potential to create crops that actively benefit wildlife or the landscape.

28. Changing policies to encourage multi-functional farming could have a major influence on the direction of GM and all other technological developments in agriculture. If it became more profitable for farmers to protect, or enhance biodiversity, or create an attractive landscape, this would encourage development of more environmentally-friendly GM technology.

29. The RSPB's concerns about the development of herbicide tolerant (HT) and insect resistant crops are largely based on the fact that the regulatory system had not considered (and did not intend to consider) the wider impacts of these crops on the environment. As a consequence commercial consent may be given to some HT crops before a full assessment is made. A regulatory process that examines these wider issues could help to encourage development of more environmentally-friendly GM crops. *The government must ensure that the regulatory process fully assesses all potential impacts of GM crops on the environment.*

If so does the Government have adequate mechanisms for developing such a strategy, in terms of: the assessment of direct and indirect risks, including cumulative impact of GMO releases over time?

30. The remit of the Advisory Committee on Releases into the Environment (ACRE) covers the direct impacts of GMO releases such as those outlined in paragraph 12. However, the remit has just been extended to include consideration of the wider and indirect impacts such as those outlined in paragraph 13. The RSPB supports the changes to widen the remit of ACRE. Our position on genetic modification of crops demonstrates that the Government should not just be concerned about the impact of the genetically modified crop itself, but also about the impact of using the crop in the countryside. The RSPB sits on the sub-committee of ACRE which is considering how to carry out this widened remit.

31. The Government is currently funding field-scale research into the direct and indirect risks impact of GM HT crops. The RSPB fully supports this work. However, *we insist that such research should be a mandatory part of the regulatory process and should be completed before the crop is considered for commercial approval.* In the current case of HT crops, it seems that commercial approval may be granted before the field-scale research is complete.

If so does the Government have adequate mechanisms for developing such a strategy, in terms of: the contribution that GMOs might make to a more sustainable agriculture?

32. As highlighted earlier, assuming that GM crops are intrinsically safe, they could contribute to more sustainable agriculture. However, we do not believe that GMOs are being developed with the purpose of enhancing the sustainability of agriculture. Moreover, little independent science has been conducted to verify the various claims of benefits, or disadvantages, of current GM crops. We also refer you to paragraphs 22-27 above in response to this question.

What mechanisms exist, or are needed, for incorporating public values and concerns regarding the environmental implications of GMOs, alongside the results of scientific assessment, within the decision-making process?

33. There are currently very few mechanisms for incorporating public values and concerns regarding the environmental implications of GMOs. *The RSPB supports the development of a Stakeholders' Forum proposed by the Government.* This could provide an opportunity for the public and civil society to express its values and views. However, *unless there existed some mechanism for incorporating the conclusions of the forum into policy, there is a real danger that such a forum could actually reduce pressure on decision makers to take public opinion into account.*

34. As important as the opportunity for the expression of public opinion is public education on the issues, a role which will necessarily fall to a number of different types of stakeholder, including government, industry, and various branches of civil society.

What is feasible and desirable in terms of preserving consumer choice by segregation and labelling—particularly the issue of “labelling for process” to provide for consumer influence over the use of GMOs and their environmental implications?

35. The RSPB does not comment on the food aspects of GM crops as this goes beyond the areas of our current expertise. However, we would recommend that if certain types of production systems can be shown to be more environmentally friendly than others, then the foods produced by such processes should be labelled as such. This would provide the kind of information which would allow motivated consumers to purchase products produced sustainably and may even include premiums for producers.

36. However, there is currently little satisfactory independent scientific information to show whether GMOs will or will not damage the environment. The RSPB has consistently called for more research, based on the existing circumstantial evidence, to identify any problems. Until this information is available it will only be possible to indicate whether the product contains GMOs or not.

What scope does the UK and EU have for policy initiatives, and what are the prospects for multilateral agreement, on the release of GMOs into the environment—with particular reference to the World Trade Organisation and GATT disciplines and obligations?

37. In the light of the concerns that RSPB has about the potential impacts of GM crops on the wider environment and the absence of an overall strategy for assessing and managing the environmental implications of the release of GMOs (including the lack of real scientific information about possible environmental impacts and insufficient regulations to govern GM crops) the RSPB calls for a moratorium on the commercial use of genetically modified crops until the Government's field-scale trials looking into the impacts of herbicide tolerant crops on wildlife are complete.

38. In February of this year the RSPB and Friends of the Earth (FoE) commissioned a detailed legal opinion examining the possibility of imposing a moratorium on the commercial growing of GM crops in the UK and under EU and World Trade Organisation (WTO) law.¹

39. The opinion contradicted the Minister of State's (Jeff Rooker's) claims that European and World Trade Law would certainly prevent the Government imposing a moratorium on the commercial release of GM crops in the UK. The opinion concludes that “the Minister's view cannot be put with that (or indeed any) degree of certainty.” On the contrary, “good arguments can be made . . . that a moratorium on the commercial growing of GM seeds would not be contrary to EU and WTO law.” A copy of the full conclusion appears in the annex below.

40. The RSPB and FoE are currently awaiting a response from government on this legal opinion.

Are there adequate arrangements for civil liability for environmental damage caused by GMOs?

41. RSPB has no comments to make on this subject.

ANNEX

IN THE MATTER OF THE RIGHT TO IMPOSE A MORATORIUM ON COMMERCIAL GROWING OF GENETICALLY MODIFIED CROPS IN THE UNITED KINGDOM

AND IN THE MATTER OF COUNCIL DIRECTIVE 90/220/EEC

AND IN THE MATTER OF WTO LAW

Opinion

CONCLUSIONS

The Minister for Agriculture has expressed with apparent certainty the view that there is no power under EU law (or apparently under WTO law) for the United Kingdom to impose a moratorium of up to five years on the commercial growing of GM seeds, in particular those which have been authorised for circulation under Directive 90/220. In my opinion the Minister's view cannot be put with that (or indeed any) degree of certainty, given that:

- there is no EU case law on point;
- the relevant WTO case law provides a proper line of argument to the effect that a moratorium could lawfully be adopted;

¹ *In the matter of the right to impose a moratorium on commercial growing of genetically modified crops in the United Kingdom, and in the matter of Council Directive 90/220/EEC, and in the matter of WTO Law.* February 1999. Full copies of this document can be obtained from Jonathan Curtoys at RSPB.

- the scientific evidence available as to the effects of GMOs is uncertain;
- the precautionary principle is gaining in authority and has been said by the European Commission to “govern” the EU regulatory regime in the field of biotechnology;
- Directive 90/220 is being amended;
- the protection of organic farming and cultivation of the countryside are relevant factors in the balance; and
- a Protocol to the Biodiversity Convention is being adopted which may also permit (or at the very least may not preclude) measures such as a provisional moratorium on commercial growing of GM seeds to be adopted.

This is not an area in which certainties of any kind prevail. I would not wish to underestimate the weight of legal arguments and evidential issues which might be marshalled against the adoption of a moratorium by the UK Government. However, good arguments can be made to support the view that a moratorium on the commercial growing of GM seeds would not be contrary to EU and WTO law.

For the reasons set out above, in my opinion:

- (1) The inability of Article 16 of Directive 90/220 to permit the United Kingdom to adopt a general moratorium (even provisional) on the commercial growing of GM seeds does not prevent the United Kingdom from being entitled to adopt, under Article 100a(4) of the EC Treaty, a general moratorium on the commercial growing of GM seeds if the measures:
 - (a) can be shown to be justified on grounds of environmental protection;
 - (b) are not a means of arbitrary discrimination or a disguised restriction on trade; and
 - (c) are proportionate to the aims to be addressed (i.e., no less trade restrictive measure is available);
- (2) once it enters into force new Article 95(5) of the EC Treaty would allow the United Kingdom to adopt a general moratorium on the commercial growing of GM seeds if the measures: (a) are based on new scientific evidence (obtained after the adoption of Directive 90/220, or any amendments thereto); (b) are intended to address a problem specific to the United Kingdom; (c) concern a problem that has arisen after the adoption of Directive 90/220 (or any amendments thereto); and (d) do not constitute a means of arbitrary discrimination or a disguised restriction on trade between Member States or an obstacle to the functioning of the internal market;
- (3) a general moratorium by the United Kingdom on the commercial growing of GM seeds which was caught by Article III.4 and/or Article XI of GATT 1994 would fall within the exceptions provided by Articles XX(b) and/or (g) of GATT 1994 if it could be shown that: (a) the policy measure for which the provision was invoked fell within the range of policies designed to protect human, animal or plant life and health and that the measure was necessary to fulfil the policy objective; and/or (b) that the measure was concerned with the conservation of “exhaustible natural resources”, relates to the conservation of such resources, and is made effective in conjunction with restrictions on domestic production; and (c) is not an arbitrary or unjustifiable discrimination between countries where the same conditions prevail, or a disguised restriction on international trade; and
- (4) to the extent that a moratorium on commercial growing of GM seeds was an SPS measure within the meaning of the SPS Agreement (WTO), then it is properly arguable that the United Kingdom could adopt a moratorium on the basis of Article 5.7 of the SPS Agreement;
- (5) to the extent that such a moratorium was not such an SPS measure and fell to be considered under Article XX GATT 1994, its presentation as analogous to an SPS measure would allow an approach analogous to Article 5.7 of the SPS Agreement to be adopted to justify such a moratorium.

February 1999

APPENDIX 14

Memorandum from Dr Julian Kinderlerer, Assistant Director, Sheffield Institute of Biotechnological Law and Ethics (SIBLE)

I write in response to your invitation for written submissions, as this topic is one about which I feel passionately and about which I have been involved for over a decade.

There is a need at the outset to declare an interest. I have been a member of the *Advisory Committee on Genetic Modification* (ACGM) since its formation in 1984 and now of ACGM's technical sub-committee. I was also a member of the predecessor of the *Advisory Committee on Releases into the Environment*, ACRE, during the 1980s—the intentional introduction sub-committee of ACGM—and have been a member of ACRE since its foundation in the early 1990s. I have also served as a member of the Microbiological Risk Assessment Working

Group of the Advisory Committee on Dangerous Pathogens. In addition, I have had the opportunity to help set up the regulatory system in many other countries, including the Russian Federation, Bulgaria, Czech Republic, Thailand, Malaysia, South Africa, Namibia, Mexico and Brazil through work with the UNIDO and UNEP. The respect in the international community for the layered system we have set up in the UK needs to be acknowledged. While aware that the European System for oversight of biotechnology would seem to be failing, that instituted in the United Kingdom has been copied by many, and I am often surprised how much of that written for the guidance of those using the technology here in Britain appears in official papers in other countries.

I was the specialist adviser to the House of Lords Select Committee on European Legislation, Sub-committee D (Agriculture and Food) during its investigation into the regulatory system on Genetically Modified food and agriculture during 1998. The report was published on 21 January 1999. It is important, therefore, to note that anything that appears in this memorandum is my own opinion.

The Sheffield Institute of Biotechnological Law and Ethics advises on legal systems for the assurance of safety in biotechnology. It was set up to enable the expertise of many individuals within the University of Sheffield relating to the ethical and legal issues which dictate the manner in which this new technology may be used to be harnessed. The Institute defines Biotechnology extremely widely, including the use and introduction of genetically modified organisms into the environment and the food chain and the use of the technology within medicine. Biosafety and its regulation have formed a major plank in its work, as have intellectual property rights (including plant variety rights) and the need to consider ethical principles in the adoption of modern biotechnology to industry, agriculture, food and medicine.

1. IS THERE A NEED TO DEVELOP A STRATEGY FOR ASSESSING AND MANAGING THE ENVIRONMENTAL IMPLICATIONS OF THE RELEASE OF GMOs?

1.1 The UK was probably the first or second country to consider the likely impact on the environment of the introduction of genetically modified organisms. ACGM set up a sub-committee—the Intentional Introduction Sub-Committee—to oversee a voluntary code of practice for those intending to move work with transgenic organisms from the laboratory into field trials. The oversight was comprehensive, and differed from that introduced in the United States which was concerned to ensure that any GMO that arose from something already identified as a pest should be “regulated”. It was seen to be important that the risk to human health and the environment was assessed, independently of any benefit that might ensue. The lack of precision in being able to define benefit made this approach feasible, and whereas risk was seen to be capable of estimation and scientific analysis, benefit was seen to be subjective. The committee assumed a role of assessing risk of a particular release under the proposed conditions without attempting an assessment of the scientific validity of the work, or even the scientific rigour of the design. There was seen to be a difference between a funding authority that had to assure itself that an experimental protocol would provide the information sought, and the safety assessment, where only the safety of those involved in the experiment and the environment could be considered.

1.2 This approach continued after 1990 when Directive 90/220 and the Environment Protection Act made ACRE a statutory committee. The Directive implemented a regime seen broadly to be based on that which had been implemented in the UK. The assurance of safety was limited to the application being considered, and the conditions being suggested by the applicant. ACRE did note that there might be problems when commercial applications of the technology were to be implemented. They expressed concern to MAFF on the possibility of gene stacking (for example) if similar crops with different inserted genes were to be released on a commercial scale, and asked the ministry to consider the implications before it was too late to act. The vast majority of applications considered by ACRE have been limited field trials, where the transgenic plants were essentially contained. There has been some concern in the committee that the risk evaluation procedures have ensured that little information can be derived from the experiments to allow assessment of the likely environmental harm that might occur were the containment or scale to be increased.

1.3 Risk assessment in this area is unlike risk assessment in many areas of science. In general, risk assessment is as far as is possible a quantitative science. Measurements are taken, and the results allow for a quantitative assessment of risk. This approach cannot work for the environmental risk associated with GMOs. The number of variables is great, and most of the data on which assessment of risk could be based does not exist. Even the factors that determine a weed are disputed. Risk assessment has therefore relied on a qualitative estimate, based on scientific judgment. ACRE performs an audit role, trying to ensure that as much as possible is known about any of the parameters that may affect either human health or the environment is known. ACRE examines the data and the risk assessment provided by an applicant and uses the expertise and experience of its membership to ensure that the information provided is self-consistent and accurate; that all the necessary information has been provided; that the assessment is reasonable and that the risk management procedures will ensure the safe use of the modified organisms.

1.4 If ACRE considers the safe use of the technology and does not consider benefits, then a comparison of industrialised or intensive agriculture with the new technology is not made. This is certainly true for ACRE's review of trial releases, where only the conditions of the release are taken into account during the assessment. I do not believe this to be true for commercial releases. ACRE has differentiated between the impact on the

“natural” environment and on agriculture. The former is seen to be within the remit of the risk assessment and management role, the latter has been seen almost as a commercial problem that needs to be considered as part of the commercial risk taken by farmers in choosing what they grow and their farming methods. The committee is aware that intensive agriculture harms the environment, and has implicitly adopted an approach that compares the likely impact of the transgenic organism to this industrialised agriculture. The impact of the new varieties on adjacent farms was also initially seen in this light.

1.5 If risks are capable of being assessed, albeit qualitatively, then I believe “negative risks” or benefits to the environment are also assessable. The criteria used, and the principles that need to be applied to risk and benefit analysis need to be identified (insofar as it is possible) and the process needs to be open. Traditional cost-benefit analysis will not succeed in ensuring the safe use of this new technology.

2. IF SO, DOES THE GOVERNMENT HAVE ADEQUATE MECHANISMS FOR DEVELOPING SUCH A STRATEGY?

2.1 ACRE is a scientific committee that has fulfilled its primary role of ensuring the safe introduction of genetically modified organisms into the environment. There have been no accidents and none of the perceived hazards of these organisms have been observed. The scientific expertise and experience has allowed a careful and reasoned assessment of risk to be performed, and the management procedures instituted have worked.

2.2 I believe that the case-by-case analysis that ACRE has performed well is not sufficient to ensure total safety, or to allay public concern. It has not allowed consideration of the likely changes in farming practice due to the new technology, nor has it considered the impact of these changes on the “wider” environment. Although the Government has now placed these within ACRE’s ambit, it does not really have the knowledge to tackle these major questions. They are not really directly associated with transgenic organisms, but rather with the ability to change practice. It is important that these new effects are properly considered and the implications for the environment are properly addressed.

2.3 There are many committees in the Departments of the Environment, Agriculture and Health that address some but not all of the issues. None of the committees have the expertise both to examine all the implications of the technology and the necessary case by case assessments. It has been suggested that meetings of committee chairmen might allow the in-depth consideration needed. I do not believe this to be feasible. It has also been suggested that a forum would allow all those concerned about the environmental impact to provide the necessary brake. Again, this seems likely to result in people talking at each other, rather than attempting to solve problems. It seems, therefore, that a new committee should be set up, with a very clear brief to consult openly and widely, and issue reports on the wider environmental implications. This committee could have issues referred to it by the individual committees that examine individual cases, or by ministers, and could identify the principles that might be used by the other committees. In taking the wider view, and consulting widely, a coherent approach to the introduction of GMOs into our environment could result.

2.4 Intensification of agriculture has proceeded apace since the end of the Second World War. The green revolution needed a huge chemical input to sustain it, and the provision of enough food at the right place is dependent on this chemical input. Organic production methods cannot sustain the needed amount of food without significant changes to the crops and to our eating patterns. The introduction of modified organisms elsewhere in the world has also proceeded apace. At times it seems that the care we are taking to ensure that as little change to our environment as possible occurs is not mirrored by those countries that have allowed their introduction at an almost alarming pace. With nearly 30 million hectares of transgenic crops in the US, they are already covering more than four times as much agricultural land as there is land for agriculture in the UK. None of the products released so far is important for sustainable agriculture. However, it is not difficult to identify products that may be “designed” to allow sustainable use, and given finance, there is no scientific reason for these not to be introduced. It may be that sustainable farming practice is not seen by the large companies as profitable (in the short term), and that there would need to be some incentive to allow the development of new crop varieties that assist sustainability, both in the developed and developing countries.

3. WHAT MECHANISMS EXIST, OR ARE NEEDED, FOR INCORPORATING PUBLIC VALUES AND CONCERNS REGARDING THE ENVIRONMENTAL IMPLICATIONS OF GMOs, ALONGSIDE THE RESULTS OF SCIENTIFIC ASSESSMENT WITHIN THE DECISION MAKING PROCESS?

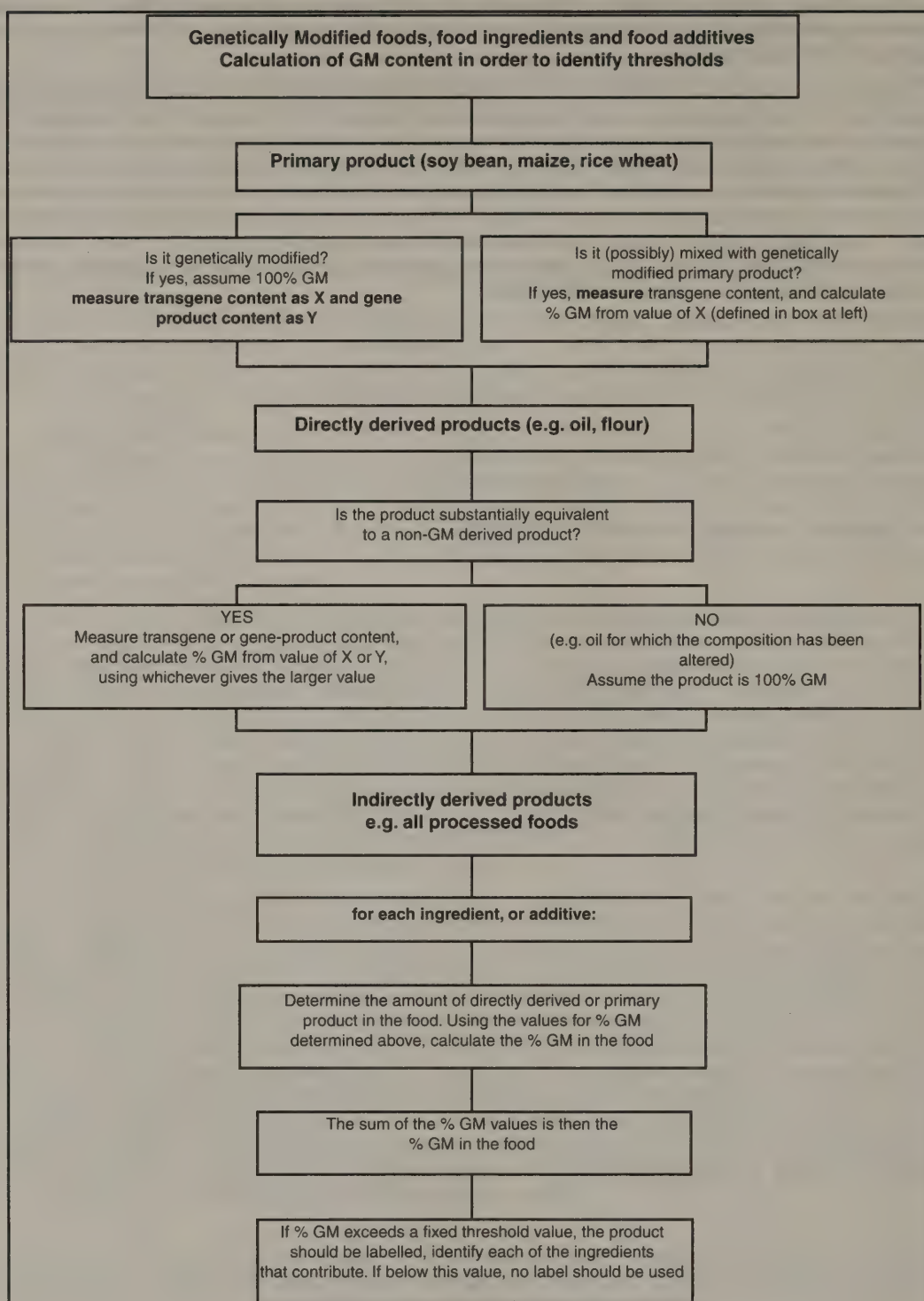
3.1 I have suggested a new committee with responsibility for considering the wider issues. That committee should have a remit to consult widely, with all those concerned, and report to Government on what should be put into place to assist public acceptance of the new technology, or not allow its use.

4. WHAT IS FEASIBLE AND DESIRABLE IN TERMS OF PRESERVING CONSUMER CHOICE BY SEGREGATION AND LABELLING—PARTICULARLY THE ISSUE OF “LABELLING FOR PROCESS” TO PROVIDE FOR CONSUMER INFLUENCE OVER THE USE OF GMOs AND THEIR ENVIRONMENTAL IMPLICATIONS?

4.1 The USA and Canada have rejected the use of labelling of GMOs unless the product has changed in a perceptible way, and in Canada, the labelling must then only indicate the change, rather than that it is genetically modified to achieve the change. Hence an increase in short-chain fatty acids in the oil of canola (oil-seed rape)

is labelled as high lauryl canola. We have chosen, even before the outcry, to label as much as possible as genetically modified in order to ensure that consumers are able to say no to the process. This is true whether the product is grown in the UK or whether it is imported as a food or food constituent. I firmly believe that it is important to label where possible.

4.2 It is easy to label primary products, or even secondary products. However, the lack of segregation makes this extremely difficult. If pollen does result in a small but measurable "GM" presence in non-transgenic crops, or if containers are not sufficiently cleaned so that non-transgenic material contains detectable amounts of the GMO, then virtually everything will have to be labelled unless reasonable thresholds are identified. It is the identification of thresholds that is difficult, and this is compounded in that the labelling is only to allow choice to reject that which is GM. The scheme defined below should allow an unambiguous method of calculating GM content of a food. Only if a food exceeds a specified threshold should labelling as genetically modified be used. If there are concerns about allergenicity, the food should (separately) be labelled as having possibly allergenic properties as, for example "contains ground-nut protein".



5. WHAT SCOPE DOES THE UK AND EU HAVE FOR POLICY INITIATIVES, AND WHAT ARE THE PROSPECTS FOR MULTILATERAL AGREEMENT ON THE RELEASE OF GMOs INTO THE ENVIRONMENT?

5.1 The collapse of the negotiations during February that would have led to a protocol under the Convention on Biological Diversity is disastrous. The WTO requires an importing country to be able to show conclusively that the imported product is unsafe before permitting trade barriers to its importation. The manner in which *Codex Alimentarius* works appears to make the assessment of safety of food political rather than scientific. Hence it would be extremely difficult to stop the importation of foods because of the manner the WTO has chosen to define its remit. It is important, therefore, to work to ensure that the Protocol is implemented as soon as possible to provide the means to properly consider environmental impact.

6. ARE THERE ADEQUATE ARRANGEMENTS FOR CIVIL LIABILITY FOR ENVIRONMENTAL DAMAGE CAUSED BY GMOs?

6.1 The UK has chosen not to sign the Lugano Convention,¹ which imposes strict liability for environmental damage caused by GMOs. A small number of countries, including the Netherlands, have signed this convention. There is no clear identification of who may be liable in Britain should there be a problem—the seed producer, farmer, or government that approved the use, may all share liability.

March 1999

APPENDIX 15

Memorandum from the Supply Chain Initiative on Modified Agricultural Crops (SCIMAC)

GENETICALLY MODIFIED ORGANISMS AND THE ENVIRONMENT

INTRODUCTION

The Supply Chain Initiative on Modified Agricultural Crops (SCIMAC) welcomes the opportunity to submit evidence to the Environmental Audit Committee's inquiry into GMOs and the environment. Our response focuses on the policy arrangements within Government for the development and introduction of genetically modified (GM) crops in relation to environmental protection and conservation issues. SCIMAC representatives would be willing to provide oral evidence to supplement this submission if required.

SCIMAC is a formal grouping of industry organisations representing farmers, the seed trade, plant breeders and biotechnology companies. SCIMAC was established to support the responsible, open and effective integration of GM crop technology into UK agriculture.

To this end, SCIMAC member organisations have agreed a joint programme of stewardship to manage and monitor the first large-scale plantings of GM crops on UK farms. This cross-industry initiative has been developed to promote best practice along the primary supply chain, to underpin public confidence, and to facilitate consumer choice.

Agreement in principle with the SCIMAC initiative was announced by Government Ministers in October 1998.

Membership of SCIMAC comprises the National Farmers Union, British Society of Plant Breeders, British Agrochemicals Association, UK Agricultural Supply Trade Association and British Sugar Beet Seed Producers Association.

SCIMAC fully supports the application of appropriate and transparent regulatory controls to the use of genetic modification in agriculture and food production in order to safeguard human health, food and environmental safety. Science-based legislation, consistently applied, is needed to reinforce public confidence in biotechnology and to ensure its responsible development and use by industry.

1. *Is there a need to develop a strategy for assessing and managing the environmental implications of the release of GMOs?*

Yes. SCIMAC welcomes and supports current initiatives at UK and EU level to develop a coherent strategy for assessing and managing the environmental implications of GM crops, which should include both benefit and risk assessment in direct comparison with current agricultural practice.

The direct environmental implications of GM crops—e.g., in terms of gene transfer, volunteer control and genetic stability—are addressed in detail on a case-by-case basis through existing regulations. Each GM crop application must be supported by a comprehensive dossier of evidence submitted to the Department of the

¹ Council of Europe, ETS No. 150, 21 June 1993. Convention on Civil Liability for Damage resulting from Activities dangerous to the Environment: <http://www.coe.fr/eng/legal/txt/150e.htm>

Environment, Transport and the Regions. Before issuing a release consent, Environment Ministers must be satisfied that the risk to the environment is "low to effectively zero".

In the case of GM herbicide tolerant crop varieties (the first GM crop types nearing commercialisation in the UK), the safety, environmental impact and efficacy of the herbicides in question are also stringently regulated through the Pesticides Safety Directorate.

Many of the issues raised in relation to the environmental implications of GM crops concern the wider environmental impact of modern agriculture as a whole. Consideration of GM crops must therefore take account of current on-farm management systems.

There is currently no baseline understanding and inventory of current forms of agriculture to assess their long-term ecological and environmental impact. Without such comparative data, there is no effective way to provide a comparative evaluation of both the positive and/or negative effects of GM crops.

In December 1998, EU Environment Ministers agreed unanimously to adopt the procedures proposed in two new annexes to EC Directive 90/220 for future GM crop applications. These cover assessment for wider biodiversity implications and post-approval monitoring for environmental effects. The SCIMAC initiative seeks to address both requirements.

SCIMAC has welcomed the opportunity to collaborate with Government departments, independent scientists and conservation advisers to establish a programme of farm-scale biodiversity evaluations for GM and non-GM crops, beginning in spring 1999.

The objective of this Government-led programme is to evaluate the issues raised by English Nature and others in relation to the wider effects on biodiversity and implications for farm management practice of GM herbicide tolerant crops compared with equivalent non-GM crops.

The only way to gather meaningful biodiversity data on the impact of GM versus non-GM is not via the small-scale trials used to establish direct environmental effects, but in the context of field-scale comparisons grown to replicate normal farming practice.

SCIMAC is aware of no scientific evidence to support claims of negative biodiversity effects relating to GM crops. DETR has made it clear that the farm-scale evaluations have been specifically designed to test this null hypothesis.

SCIMAC has consistently maintained that, effectively managed, GM crops offer the potential for significant environmental advantages. In the case of GM herbicide tolerance, these may include reduced herbicide applications; the option to use contact-acting herbicides which are rapidly biodegradable in the environment with minimal soil residual activity; improved cultivation techniques; and greater flexibility in weed management.

In terms of post-approval monitoring, SCIMAC has developed guidelines for the responsible and effective introduction of GM crops onto UK farms. These include requirements for detailed monitoring and record-keeping on the farm, of both GM crops and subsequent cropping through the rotation. On-farm records must be maintained for a minimum of seven years.

The SCIMAC stewardship programme will be applied through a legal framework of contractual agreements, subject to inspection and independent audit. This framework mirrors the proven and robust system already in place for the production of certified seed crops.

2. *Does the Government have adequate mechanisms for developing such a strategy in terms of:*

— the co-ordination of existing policy and regulation?

SCIMAC welcomes the establishment of an over-arching cross-departmental Ministerial Cabinet Committee on Biotechnology and Genetic Modification. It is hoped that the role of this Committee in overseeing the various regulatory functions within Government will ensure consistency in application and direction, and will minimise any potential for overlap or unnecessary delay caused by lack of co-ordination.

— oversight of, and influence over, the direction of development of GMOs?

SCIMAC believes that the Government does have adequate mechanisms to influence the direction of GM crop development.

However, SCIMAC does not believe that Government influence over the direction of future developments should be technology-specific, but rather linked to a clear set of broader environmental objectives applied to all forms of technological innovation.

— the assessment of direct and indirect risks, including the cumulative impact of GMO releases over time?

Yes. It is a statutory requirement under EC Directive 90/220 for the consent holder to notify the competent authority (DETR in the UK) of any new relevant information which may affect the original consent, e.g., (i)

any increase in volunteer populations in cropped or uncropped land; (ii) difficulties in controlling volunteers; (iii) any unexpected environmental effects.

In addition, SCIMAC has developed guidelines for the responsible and effective introduction of GM crops onto UK farms. These include requirements for detailed monitoring and record-keeping on the farm, of both GM crops and subsequent cropping through the rotation. On-farm records must be maintained for a minimum of seven years.

Under the SCIMAC stewardship programme, helplines, monitoring and reporting systems will be operated by individual companies to record any suspected or apparent adverse occurrences from individual farmers, SCIMAC will publish an annual summary of feedback received.

— *the contribution that GMOs might make to more sustainable agriculture?*

No. SCIMAC has consistently maintained that the environmental implications of GM crop technology must be evaluated and assessed in direct comparison with existing on-farm practices.

GM crop technology offers the potential to contribute significantly to more sustainable forms of agriculture. What matters is not the use of GM technology *per se*, but rather the way in which it is applied and how the resulting products are managed.

The SCIMAC stewardship programme has been developed specifically to ensure that a robust framework of advice, monitoring and control exists for the managed development and introduction of GM crops which will allow their potential environmental benefits to be realised.

3. *What mechanisms exist, or are needed, for incorporating public values and concerns regarding the environmental implications of GMOs, alongside the results of scientific assessment within the decision-making process?*

SCIMAC supports recent moves to increase transparency in the UK regulatory process. Public participation in the regulatory system is central to this process, and SCIMAC specifically welcomes the involvement of lay representatives, for example as members of the specialist advisory committees concerned with environmental and food safety (ACRE, ACNFP).

Further moves to promote transparency by these advisory committees include the publication of agenda and minutes, the listing of commercial interests of committee members, the introduction of newsletters and the use of public meetings.

SCIMAC is committed to ensuring that all sides of the GM debate are carefully and thoroughly considered. A proposed Environmental Stakeholders Forum would provide the opportunity for wider interest groups to have their say in a single body. However, the terms of reference, membership and size of such a forum must be clearly defined to ensure that it is fully representative, science-based and that the groups involved are accountable for views expressed. SCIMAC believes such a body, if established, should support rather than add to the current regulatory system and advisory committee structure.

4. *What is feasible and desirable in terms of preserving consumer choice by segregation and labelling—particularly the issue of “labelling for process” to provide consumer influence over the use of GMOs and their implications?*

SCIMAC is committed to the provision of full and open consumer information, and supports the right of consumers to decide whether or not to purchase products containing GM ingredients.

To this end, the SCIMAC stewardship programme establishes a UK framework for identity preservation of GM crops up to and including sale of the harvested crop ex-farm. This will provide the information required by those further along the food supply chain to manage storage and processing operations effectively, to conserve the value of the harvested commodity and to ensure appropriate record-keeping and onward transfer of information.

However, there is an urgent requirement for consistent thresholds to be agreed on an EU-wide basis relating to the status of products labelled as containing GM ingredients or GM-free. Such thresholds are already accepted and applied in other product sectors (e.g., organic). Any such labelling provisions must be meaningful and verifiable through proven testing methods.

5. *What scope does the UK and EU have for policy initiatives, and what are the prospects for multilateral agreement on the release of GMOs into the environment—with particular reference to the World Trade Organisation and GATT disciplines and obligations?*

SCIMAC believes progress towards a more harmonised, EU-wide “one door, one key” approach to GM regulation would help in preventing unnecessary overlap or delay.

SCIMAC further believes that international harmonisation of GM regulation will help to maintain the UK’s competitiveness and prevent loss of jobs, investment and expertise to other countries. OECD has done most of

the groundwork to ensure that regulations in its member nations are based on sound science. This may provide the basis for progress towards more unified regulatory structures and more consistent application of internationally accepted food safety and environmental controls.

6. *Are there adequate arrangements for civil liability for environmental damage caused by GMOs?*

Yes. Once fully approved for commercial release and marketing, SCIMAC sees no basis on which to single out the environmental effects of GM crops as unique in civil liability terms, i.e., as distinct from environmental damage caused by any other form of agricultural or land use activity. As described earlier, SCIMAC is committed to ensuring the responsible and effective integration of GM crops into UK agriculture through a programme of managed and monitored development.

April 1999

APPENDIX 16

Memorandum from the United Kingdom Environmental Law Association

Thank you on behalf of the Biotechnology Working Party of the United Kingdom Environmental Law Association for the opportunity to submit evidence on "Genetically modified organisms and the environment". In response to the specific questions raised we comment as follows:

IS THERE A NEED TO DEVELOP A STRATEGY FOR ASSESSING AND MANAGING THE ENVIRONMENTAL IMPLICATIONS OF THE RELEASE OF GMOs?

The licensing system carried out by the Advisory Committee on Releases to the Environment (ACRE) on behalf of the Secretary of State for the Environment is designed to prevent "harm" and "damage to the environment". The definition of "harm" as *harm to human health or other living organisms and interference with the ecological systems of which they form part* is used in many different areas of environmental law. Damage to the environment is defined as occurring from the presence of GMOs capable of causing harm.

It is axiomatic that the regulatory system for environmental release of GMOs should include assessment of the environmental implications of their entry into and multiplication in the environment. The public pronouncements of ACRE make it clear that this is being done already. Whether this amounts to a "strategy" on behalf of the Government is open to debate.

ACRE will only recommend licensing of new GMOs where its technical assessment is that "harm" is not likely to be caused. ACRE publishes comprehensive minutes of its meetings together with technical reports and other material (and is certainly a model of openness in the way in which regulatory advice is publicised). However, although doubtless ACRE's decisions are made after thorough discussion and detailed examination, what is not so clear for observers is the detail of analysis in deciding whether or not harm is likely to be caused, and how broadly or narrowly the ACRE members consider that this term should be construed.

There is certainly a view that, with proper regulation, GMOs may enable us to greatly reduce the use of pesticides and agrochemicals. They may also provide us with a new range of opportunities for "green technology" to give less polluting routes to chemical products and fuels. This technology may well be an essential component of sustainable development (we have to remember that currently the world population is growing at a rate of 60 million a year—arguably the precautionary principle does not consist of doing nothing when worldwide there are already serious problems). On this analysis the formal assessment of benefits of GM crops should surely be part of a regulatory strategy.

On the other hand there is a view that the scale of change presented by GM technology may be orders or magnitude above anything experienced previously in plant breeding/animal husbandry. On this analysis there should be a strategic approach assessing overall and cumulative approach of releases (including questions of need and alternatives) as well as a detailed and open scientific scrutiny of each proposed release. It is also the case that currently clearance obtained in one EU state will, unless specifically objected to, permit introduction of a GMO in another state. As the process is streamlined, and numbers of applications increase, it is likely that there will be an increased reliance on "second hand" environmental data. Even within one country, however, environmental risks may vary greatly from location to location. The regulatory process and overall strategy will need to ensure that this issue is considered.

One aspect of the GM debate which has received much attention recently is the decline in the quality and quantity of farmland wildlife over the past 50 years and the potential future impact of GM crops in this process. The Government seeks to halt and where possible reverse this decline. Although the reasons for it are not completely understood, the decline is probably the result of a combination of many factors (including European farm policy via the CAP and changes in chemical use, crop varieties and farming practice generally). A

moratorium on the use of GM crops is not going to reverse this decline on its own. There is also a view that the use of GMOs, if properly regulated, is one way of reversing this decline (for example by allowing agricultural production to be concentrated on a smaller area of countryside thus freeing up more land for conservation). To what extent should regulation of GM crops be used as a means to attempt to ensure that this decline does not get any worse or perhaps to attempt to reverse it? Put another way, what is the yardstick against which GM crops should be compared when assessing whether harm is likely to occur.

To an extent this decision has already been made obliquely by broadening the remit of ACRE to include such biodiversity issues. This change appears to have been made in response to increased information about the potential environmental impact of GM crops, some of which arose from experimental GMO releases. Although evolution of the regulatory system in this way shows in-built flexibility, such flexibility may be at the expense of clarity and consistency.

It would certainly be possible for regulation to be both more transparent and to be put on a more strategic level. This could be done by the publication of detailed guidance to DETR on the criteria which ACRE are to use in reaching their decisions to recommend or refuse release applications. Guidance to the "regulator" is published in most areas of environmental law and there is no obvious reason why the control of the environmental release of GMOs should be any different. Although it will not be able to provide for every eventuality, statutory guidance should be able to provide greater certainty for both the regulator and applicants for consent to release.

Development of such guidance could prove a way of developing an overall strategy for regulation. It would be logical for that strategy to be developed as part of the process of revisions to the 1990 EU Deliberate Release Directive which are currently under debate.

It must be recognised, however, that "tight" guidelines for the regulators would not now be appropriate because of the gaps in our knowledge and the pace of technical change and growth of understanding. General guidance is certainly required for regulators but a flexible approach based on best contemporary knowledge is needed. We should be able to respond to new knowledge and profit from experience. Arguably, however, such new knowledge is not gained in any strategic way at present because there is no specific requirement under current law for long-term monitoring.

IF SO, DOES THE GOVERNMENT HAVE ADEQUATE MECHANISMS FOR DEVELOPING SUCH A STRATEGY?

Existing policy and regulation involves DETR, MAFF, HSE, DOH and DTI served by several advisory committees including ACRE and ACNFP as well as the overreaching influence of the EU. To the observer it appears that DETR on the one hand and MAFF/DTI on the other are approaching the regulatory system from quite different angles. It appears that DETR is moving towards greater consideration of the wider environmental perspective with MAFF/DTI being concerned to ensure that UK competitiveness in this fast growing sector is not impaired.

The recent furores over ecological effects of environmental release and the safety of GM foods has not shown any clear overriding Government policy on this issue. On the evidence of history, therefore, the Government does not currently have adequate mechanisms for developing a strategy for assessing the environmental implications of release. One major difficulty is that although research experience with GM crops is growing, it is still far from complete. A major research programme is underway. At the same time imported GM soyabean and maize are being widely used in processed foods, (imports of these crops required a marketing release from ACRE). These separate issues of environmental release of GM crops for cultivation in Europe and release by importation (where food safety is the major issue) appear to have become muddled. This suggests that developing and presenting an overall strategy is necessary.

With regard to "influence over the direction of development of GMOs" the Government can only influence work in the UK and then, unless it finances the work itself, only in a negative way. Work will continue outside the UK whatever the UK Government does and UK companies and scientists can easily move out.

A strong case can be made for a new expert committee to monitor developments on a regular basis and advise Government on strategy. The remit of such a committee would not be to take day to day regulatory decisions but to oversee the field and advise. Their reports should be made as widely available as possible to inform the public as well as Government. The membership of such a group would inevitably have to draw on academics as well as industry, etc., and the need to pay adequately cannot be avoided.

WHAT MECHANISMS EXIST, OR ARE NEEDED, FOR INCORPORATING PUBLIC VALUES AND CONCERNS REGARDING THE ENVIRONMENTAL IMPLICATIONS OF GMOs, ALONGSIDE THE RESULTS OF SCIENTIFIC ASSESSMENT, WITHIN THE DECISION MAKING PROCESS?

A well informed public is essential and transparency in decision making important. Public confidence in the decision making process is needed and unfortunately politicians, industry and scientists have to regain public confidence not simply maintain it. This can only be achieved by including a wide cross section of opinion in decision making and taking positive steps to inform. Again it will involve the Government in expenditure.

The framework of decision making for the Secretary of State under the Deliberate Release Directive and Part VI of the Environmental Protection Act is technical rather than ethical. The system is designed to prevent harm to human health and the environment rather than provide a way of controlling a technology that some people might not like. The same can be said of the licensing systems for agrochemical or pharmaceuticals. If the product is safe but is not ethically acceptable to a significant section of the population (provided that information is available to make an informed choice), it will not succeed.

This regulatory system is therefore quite different to, for example, the regulation of human genetic manipulation by the Human Reproduction and Embryology Authority. There a regulatory system was introduced based on widespread public agreement about what was ethically acceptable. There is no equivalent consensus in relation to GM Crops.

The regulatory system would, however, command no public confidence if it failed to take into account public values and concerns provided that those concerns are soundly based. There are various ways in which this could be achieved. One is by ensuring that the regulatory body itself includes representatives from a cross section of opinion (as is the case for the Advisory Committee on Pesticides). Another is for the Government to provide detailed guidance on the criteria which the regulator should apply in its decision making.

WHAT IS FEASIBLE AND DESIRABLE IN TERMS OF PRESERVING CONSUMER CHOICE BY SEGREGATION AND LABELLING—PARTICULARLY THE ISSUE OF “LABELLING FOR PROCESS” TO PROVIDE FOR CONSUMER INFLUENCE OVER THE USE OF GMOs AND THEIR ENVIRONMENTAL IMPLICATIONS?

The present legal system on the labelling of foods in which genetic modification has been or may have been used has been much criticised for its lack of clarity.

There are at least two issues here. One is the provision of information in such a way that interested consumers can quickly and easily find what they want to know. The issue here is more practical than legal. Already there are bar code scanning devices which can be used to check whether supermarket products contain nut products which might cause an allergic reaction. In the information age why shouldn't this technology be available to scan for GM foods? On the other hand bar coding can only be done by the final packager of the goods and this raises the question of how they find out. Will retailers have to carry out scientific tests to establish if something is or is not of GMO origin? It has to be recognised that with increasing scientific knowledge it becomes possible to detect ever smaller amounts of fragments of genetically modified DNA. The food additive lecithin, for example, is the same chemical substance whatever its origin. The molecular structure will always be the same. However, the trace impurities present will not be the same. There are technical means of simply multiplying up a few molecules of DNA until enough copies are available to identify its origins. What level of “contamination” should be acceptable in relation to any informational or labelling protocol?

This raises the question of who is to test, who is to pay for testing and how are quality assurance standards to be set and monitored for testing procedures and laboratories.

A second, but related, issue is the presentation of information to the consumer by “headline labels” along the lines of “genetically modified” as used voluntarily for tomato paste by Zeneca or its antithesis: “GM-free”. This is more problematic in terms of legal controls in that such headline labels could potentially be highly misleading and confusing. As an example under current EU labelling rules a food may contain oil derived from a GM crop but, because the oil itself is chemically indistinguishable from oil from the equivalent non-GM crop (although the impurities will be different, as discussed above), the food would not have to be labelled. This system is quite logical in terms of an approach which looks at the quality of the end product rather than the process, but arguably deprives consumers an element of real choice. Choice in this respect may be as much about decisions as to environmental impacts from growing the food as about issues of food safety.

ARE THERE ADEQUATE ARRANGEMENTS FOR CIVIL LIABILITY FOR ENVIRONMENTAL DAMAGE CAUSED BY GMOs?

In the case of damage arising from an unauthorised or accidental release then the normal rules of tort law would apply. However, proof of harm and causation might both cause difficulties.

The linked questions of remoteness of damage and foreseeability also need to be considered. If there has been an authorised release then, for that authorisation to have been given, experts will not have foreseen harm. It is, however, conceivable that something unforeseen and indeed, unforeseeable by the “common Nobel Laureate on the Clapham omnibus” at that time, may occur. Should anyone be liable for this? Given the nature of gradual environmental charge limitation periods may also need to be addressed.

Biological agents differ very markedly from chemical substances in that replication can occur and also genetic material might be transferred between species. This coupled with the complex interrelationships in living communities, means that in many, if not most cases, it will be difficult to decide the extent in both space and time of any damage arising from an incident. Who will be affected and who has *locus standi* are related. Loss may be suffered by the state or community as much as by an individual landowner. If the nation state or administrative region as a whole is impoverished (whether or not by a negligent act) then arguably it would not

be equitable for only landowners to be eligible for compensation. The question of the liability of the State for (negligent) decisions made by its regulators also needs to be considered.

Whether the legal mechanisms for establishing civil liability should be strengthened depends on one's point of view. On one analysis there is no logical difference between the regulation of a GM product and, for example, an agrochemical. If negligence could be proved against a manufacturer of a GM product the plaintiff should be able to recover despite the absence of any separate statutory framework for this sort of product. On the other hand civil liability is specifically provided for in relation to the deposit of waste carried out without consent under the licensing system (section 73 EPA) and it could be argued that equivalent arrangements for civil liability should be incorporated into GMO regulation.

The international dimension

There is clearly considerable scope for EU policy initiatives leading to multilateral agreements on release of GMOs into the environment although it is unrealistic to think of the UK on its own having any serious prospects of success. The EU has a strong major role in the context of GATT and the WTO. The Americans are heavily committed to GM crops and are increasingly adopting an aggressively free trade position to support what they see as their commercial interests. Nations such as China can also be expected to adopt a similar line. This means that the UK must cut through the EU context to have any hope of achieving multilateral agreement. Multilateral agreements are particularly important if labelling of GMO products and foods is to succeed. The problem of fraudulent export documentation also needs to be dealt with (there are many examples of this latter problem usually taking the form of false country of origin documentation for re-exported goods).

March 1999

APPENDIX 17

Memorandum from The World Development Movement

GMOS AND THE ENVIRONMENT

The World Development Movement welcomes this opportunity to submit evidence to the Environmental Audit Committee. WDM is a democratic membership organisation with around 25,000 supporters and 100 local groups across the UK. WDM is an independent organisation, without any institutional or political affiliation. WDM's aim is to improve the policies of companies, governments and international agencies towards the world's poor. Established in 1970, WDM has extensive experience in research, public education, advocacy and providing policy advice to politicians, civil servants and company executives.

Since 1996, WDM's main advocacy programme, *People before Profits*, has aimed to improve the practices of multinational companies towards workers, local people and the environment in the poorest countries. In response to the concerns of partner organisations in developing countries, WDM has undertaken research and policy analysis into the likely impact of genetically modified organisms (GMOs) on the environment and livelihoods of the poor in developing countries, particularly on farmers.

The conclusion is that new GMO technologies have some potential to help the poor, but contain very serious risks that, if not controlled, could result in severe environmental risks and the further marginalisation and impoverishment of millions of farmers. WDM's analysis also concludes that voluntary agreements with multinational companies are neither equitable nor feasible. WDM considers there is no substitute for coordinated action by governments at an international level to ensure that sound regulations are established for the trade and release of GMOs. The focus of this submission is therefore on the need for global rules to ensure that GMOs are to the benefit of the world's poor rather than their detriment.

This submission calls for British government leadership in agreeing such global rules. WDM is calling for urgent action by the government to re-convene negotiations in order to achieve a strong Biosafety Protocol at the earliest opportunity.

THE LIKELY IMPACT OF GMOS ON THE POOR

The major multinationals promoting GMOs are increasingly using the argument that "*genetic engineering is key to feeding the world's increasing numbers of people*" and "*slowing the acceptance of biotechnology is a luxury our hungry world cannot afford*." (both from Monsanto advertisements). WDM considers that these arguments are not founded in reality. A closer analysis of the evidence suggests that, far from feed the hungry, the unrestricted introduction of GMOs may result in further hardship for the world's poor.

The argument relies on a simplistic assumption that there are hungry people because there is not enough food in the world. However, as the World Food Programme has pointed out, the world's farmers do produce more than enough food. Yet over 800 million people go hungry.

The real problem is that the poor do not have the land, seeds and tools to grow crops, or cannot afford to buy food. It is the unjust political and economic structures at the local, national and international levels, in combination with mounting ecological damage, that marginalise the poor from food production or deny them an opportunity to buy food. As stated by Ethiopia's representative to the Biosafety Protocol negotiations, Tewolde Berhan Gebre Egziabher, *"There are still hungry people in Ethiopia, but they are hungry because they have no money, no longer because there is no food to buy . . . We strongly resent the abuse of our poverty to sway the interests of the European public"*.

In some cases, GM seeds may play a valuable role in conferring resistance to particular diseases or in adapting to specific climatic conditions. These seeds may benefit some farmers. But it is misleading to claim that GMOs will solve the problems of world hunger. The companies producing GMOs for profit will do nothing to redress the real causes of food poverty. In addition:

- few of the GM crops being produced or researched are foods that the poor can afford—most GM crops commercially grown are for animal feed (maize and soya beans). Some other crops are likely to substitute laboratory production for crops exported from developing countries (such as fructose produced by genetic engineering replacing sugar);
- the use of chemical pesticides in conjunction with GM seeds will mean that farmers and local people will be unable harvest the plants, medicines and edible herbs that co-exist with crops that are currently grown with low chemical inputs;
- much of the promise of improved economics for farmers in the industrialised countries derives from lower labour use through the use of targeted chemicals rather than increased crop yields—experience to date suggests that yields for many GM crops are no higher than those of natural varieties;
- the high cost of seed and chemical inputs to produce genetically modified crops is likely to be unavailable to poor farmers that do not have access to affordable credit, especially women farmers, and will concentrate farming in larger, industrial agricultural units;
- if small farmers do buy GM seeds, they will need to take on debt, often at high interest rates, in order to do so. This is likely to make them increasingly dependent on money-lenders and large multinational seed providers. The Research Foundation for Science, Technology and Ecology in India has documented hundreds of suicides in 1998 by farmers in India as a result of poorly performing hybrid seeds;
- most GM seeds are intended for one planting only – this means a dramatic change in the practices and costs for an estimated 80 per cent of the world's farmers that use seed that is saved and exchanged;
- replacing the diverse varieties of saved and exchanged seeds with a few dominant mono-crops increases the risk of famine from widespread crop failure due to pests or adverse climatic conditions. For example, over 50,000 varieties of plants are currently grown in India, with surveys revealing over 70 varieties in one village alone. The genes that these plants contain provide insurance against drought or the devastating affects that diseases can cause in mono-culture crops.

Therefore, the claims by multinational companies that GM seeds are the answer to world hunger are unjustified. At best, they are cynical and self-serving public relations statements. Rather, it is likely that the introduction of GMOs could create severe hardship for the world's poorest people who are concentrated in rural communities.

THE CASE OF TERMINATOR TECHNOLOGY

In May 1998, Monsanto purchased the US company Delta & Pine Land Company which, along with the US Department for Agriculture, had developed and patented a new method of ensuring that farmers would not re-use seed. The "Technology Protection System" (dubbed Terminator Technology) was followed in August 1998 by Zeneca's version and subsequently by a range of other approaches. The Rural Advancement Foundation International (RAFI), a Canadian NGO, announced earlier this year that it had discovered three dozen new patents that can be used for the genetic sterilisation of plants and seeds.

These technologies, put simply, genetically alter seeds, rendering them sterile. Plants grown from terminator seed produce seed, but that seed is sterile and will not germinate when planted. Farmers are therefore prevented from saving and exchanging seed or breeding new crop varieties to increase their seed diversity. Most importantly from the company's perspective, they are forced to purchase seed from commercial companies each season.

Terminator seeds would undermine the traditional practices of saving and exchanging seeds, thereby contributing to the maintenance of a diversity of seed varieties. RAFI estimates that this would affect 1.4 billion farmers—mainly poor farmers in sub-Saharan Africa, Asia and Latin America—who save and exchange seed.

Further, terminator technology creates the risk of transgenic pollution, resulting in sterile natural crops in neighbouring fields. There are, as yet no crops currently available with terminator technology, but Monsanto has applied for patents in over 70 countries and Zeneca in 58 countries.

There is no defensible reason for the introduction of terminator technology other than for the benefit of companies producing seed. From the perspective of these companies, terminator technology is a failsafe way of enforcing their patents. However, these companies will bear few of the ultimate risks of the technology, which will be externalised onto farmers, rural communities and the environment. The nature of these risks has been indicated by cases of unauthorised releases of GMOs into the environment (including in the UK where there is a strong regulatory regime compared to many developing countries) and evidence of transgenic contamination.

As a result, a growing number of scientists and experts in developing countries have become alarmed at the development of these new technologies. The world's largest agricultural research network, the Consultative Groups on International Agricultural Research (CGIAR) have banned terminator technologies from their crop breeding programmes. Yet, despite these social and environmental concerns, the major life science multinationals are close to introducing the first terminator seeds and there is no regulatory framework that will prevent them from introducing them on a massive scale.

THE NEED FOR GLOBAL RULES

In parallel to the fears and anger of consumers and environmentalists in the UK, there are growing anti-GMO movements in other countries. The "No to GMO" campaign in India is promoting the saving of indigenous seeds and the widespread introduction of ecologically sound agricultural systems as an alternative to a GMO crop future. It is a movement that is rapidly gaining in strength and prompting comparisons with the Gandhian movement to resist imported technology and promote hand-spun cloth.

But there is a crucial difference between the UK and developing countries. While the British government has been able to exercise its power and influence with multinationals to persuade them to voluntarily agree to a moratorium, few developing countries can do likewise. Attempts to block the import or release of GMOs are likely to be met with challenges under the World Trade Organisation, on the grounds that such restrictions constitute a restraint of trade. The efforts by civil society in the UK to block GMOs will, if anything, increase the targeting of developing countries by multinationals.

Multinationals argue that farmers and consumers can make up their own minds as to whether to choose GMOs. But the need for a moratorium in the UK demonstrates that the existing safeguards are not sufficient even in the more advanced industrialised countries. Far fewer such safeguards exist in developing countries. Some crucial differences are as follows:

- there is insufficient objective research available to farmers in developing countries to be able to make informed choices. The poorer countries have little funding for public research and most research on crop performance under local ecological conditions is undertaken by the companies that are selling the seeds. There is rarely any consideration of the likely social impacts;
- there is usually no legal recourse for the farmers if the seeds do not perform to their potential. Farmers in the USA have sued Monsanto over seeds that do not meet the claimed yields, but such liability is impossible to enforce in many developing countries. These are the conditions that have led to large numbers of suicides amongst farmers in India when they incurred debt to buy hybrid seeds which failed to produce to the advertised standards;
- there is no legal recourse for third parties (such as neighbouring farmers) to seek compensation for damage that may arise from transgenic effects;
- local seed monopolies are common, exacerbated by the vertical integration of the life sciences industry and recent mergers and acquisitions of seed distributors and retailers. Currently just ten multinationals have around 40 per cent of the world seed market and further acquisitions are likely. In Argentina, Monsanto already controls over half of the maize seed market. With little ability to travel to other regions to buy seeds, most developing country farmers face little choice other than to buy seed from their local outlet. This creates an effective monopoly in the retailing of seed, which is largely unregulated by national governments and increasingly controlled by seed producers. Therefore, many farmers will have little choice other than to buy GM seed;
- the dominant multinational life science companies such as Monsanto and Zeneca have annual revenues far larger than the GNP of many developing countries and have a powerful influence over ministries of agricultural research and extension services that provide advice to farmers. The powerful lobbying techniques employed by companies like Monsanto have recently been exposed in the UK and the EU. There is far less transparency and public scrutiny in most developing countries. It is likely that the advice given to farmers by government agencies will often be less than fully independent;
- the powerful influence that the life sciences multinationals exert over governments is also likely to affect the regulatory process governing the release of new varieties of seeds (for those countries that have such a process). The potential for "regulatory capture" has been vividly demonstrated in the case of BSE in the UK—it is a very real danger in many developing countries. Further, the protocols for testing GMOs are complex, even for the industrialised countries, and there is often far less information available on the ecological conditions that may create adverse impacts from GMOs release;

- few developing countries have well developed laws and standards to prevent coercive marketing and misleading advertising by companies (in the UK, Monsanto was cited for misleading advertising by the Advertising Standards Authority)

For these reasons WDM considers that farmers in developing countries will be denied the opportunity to make informed choices on seed purchase. Companies themselves are unlikely to take on these responsibilities. As Phil Angell, Monsanto's Director of Corporate Communications says "*Monsanto should not have to vouchsafe the safety of biotech food. Our interest is in selling as much of it as possible. Assuring its safety is the FDA's job*". As this quote points out, it is usually the role of national governments to regulate new technologies such as GMOs. This should include the ability to restrict the import and release of GMOs. For example, the Commissioner for Agriculture Research in India has vowed to stop the import of terminator seeds.

However, such restrictions are increasingly constrained by international trade rules. The challenge by the US against EU restrictions on products from cattle treated with bovine growth hormone demonstrates the degree to which free trade is likely to take precedence over risks to public health. This is particularly true in the case of new technologies where there is little existing scientific evidence of past damage. Further, the risks associated with the import of GMOs into developing countries includes a complex mix of potential environmental damage, social damage and health problems. Any such restrictions to GMOs would be challenged by the major trading nations producing GM seeds and GM products, most notably the USA.

Therefore, there is no realistic possibility that voluntary action by industry or unilateral action by national governments will be able to prevent unacceptable risks being loaded onto the environment and vulnerable people in developing countries. WDM has concluded that international regulation is urgently required in order to provide the opportunity for adequate scrutiny of imports and releases into the environment of GMOs.

THE FAILURE OF NEGOTIATIONS ON THE BIOSAFETY PROTOCOL

The best opportunity to achieve such regulation (indeed, the only existing international process) is the Biosafety Protocol, an agreement being negotiated under the UN Convention on Biological Diversity. At the time the Convention on Biological Diversity was signed, at the Earth Summit in Rio de Janeiro in 1992, nations also agreed to hold further discussion on the threat that genetic manipulation may pose for biological diversity. Nations agreed to work toward a protocol that would establish procedures for the safe trade and release of biotechnology products. Negotiations amongst 170 countries have been held over the past four years, with the aim of concluding an agreement at the Sixth Meeting of Negotiators in Cartagena, Colombia in February 1999.

The negotiations fell apart without agreement in February after disruptive tactics employed by the USA and a small group of grain exporting countries. The irony was that the US does not have official standing in the talks because it has refused to ratify the Biodiversity Convention. However, their delegation, which included a strong group of representatives of the GM industry, was able to prevent an agreement being signed.

Negotiations could be characterised by the developing countries seeking a strong protocol that would ensure they (and industrialised countries) had the right to refuse the import and release of GM seeds, food and animal feed that failed to pass an assessment of social and environmental risk. Developing countries also pressed for a system of liability to ensure that, if there was damage from GMOs, the companies producing the GMOs would be liable. This was seen as vital in order to "internalise" the risks (as well as the potential profits) into company decision-making of research, product development and marketing.

The US and the so-called Miami group argued for a narrow definition of GMOs and no liability provisions, and proposed that a clause should be inserted to give priority to World Trade Organisation rules over the Biosafety Protocol. Such a clause would have meant that any country restricting imports would have risked a challenge under WTO provisions on restraint of trade.

The position of the EU was crucial. There was some initial support for the concept of liability, including the majority view from an expert working group convened by the UK in July 1998. However, as the negotiations proceeded, the EU's support for the inclusion of liability provisions weakened. Similarly, the EU angered most developing countries when it appeared to follow the most of the US proposals to weaken the Protocol. This change in the EU's position was the key turning point that resulted in the breakdown of negotiations.

There are differing interpretations of the UK's role. The image that negotiators portrayed was that of an honest broker, trying to bring the US into the agreement, even if that meant the Protocol was weakened. But other reports painted a picture of the UK acting fully in concert with the US. *The Guardian* article on 4 February 1999 exposed that "*Britain and the United States have decided to block attempts to ban genetically modified organisms by India and other developing countries who want to protect their traditional farming methods and the food supply of the poor*".

Throughout the negotiations, the UK was also characterised by NGOs as one of the main supporters of the biotechnology industry, promoting the interests of its multinationals abroad, despite the depth of British public opinion in favour of strong regulation and the negotiation of voluntary agreements with industry. There is an apparent double standard in Britain's position to pursue a moratorium at home while its negotiators argue against regulatory protection for those countries unable to secure such voluntary agreements.

The Sixth Meeting not only failed to agree a protocol, but also failed to agree a further process for negotiations. They agreed only to hold another meeting “as soon as practicable” and no later than the next Conference of the Parties to the Biodiversity Convention (scheduled for May 2000).

In March, as soon as it became apparent that the negotiations had broken down, the World Development Movement wrote to the Environment Secretary, asking him to play a leading role in re-convening the negotiations, and, if necessary, concluding an agreement without the US. Many WDM members amongst the public have written to support such a leadership role for the government.

RECOMMENDATIONS FOR THE BRITISH GOVERNMENT

WDM recommends that the British government gives political priority, at the most senior level of government, to re-convening the Biosafety Protocol negotiations process. The aim of this initiative should be to conclude a strong agreement by September 1999. This would ensure that the issue of GMO trade is dealt with prior to the commencement of substantive discussions on the agenda for the World Trade Organisation Ministerial meeting, scheduled for November 1999.

We recommend that the Protocol contain the following key points:

- (1) It establishes the explicit right of governments to restrict the import of genetically modified food, animal feed and seeds on the basis of the Precautionary Principle applied to the risk of environmental damage, public health or social disruption, including to the livelihoods of farmers.
- (2) It requires companies producing the GMOs to be legally responsible for the consequences if damage results from use of the GMOs or products derived from them, and to pay full compensation.

We further recommend that the government pursue these aims on the understanding that it will be prepared to sign such an agreement without the endorsement of the US government.

April 1999

APPENDIX 18

Memorandum from The Department of Trade and Industry

INTRODUCTION

1. This Memorandum responds to the request of the House of Commons Environmental Audit Committee to the Department of Trade and Industry (DTI) to submit evidence to its Inquiry into Genetically Modified Organisms (GMOs) and the Environment.

2. DTI's view, consistent with that of Government as a whole, is that biotechnology is an exciting area of scientific advance which offers enormous opportunities for improving our quality of life, in terms of health, agriculture, food and environmental protection. As with all technologies, however, potential risks may arise as it develops. The products and processes created by biotechnology must therefore be carefully regulated to ensure that they are safe, and their impact on the environment, and on human and animal health, needs to be assessed. The technology may also raise ethical issues which need to be addressed.

3. The Government's primary duty is to protect people and the environment. However, this must be done in ways that do not deny people the healthcare, environmental, economic and other benefits that flow from technological advances. The UK has a comprehensive framework in place to regulate and advise on biotechnology, and to assess new products rigorously before they are approved for use, and advising on the wider issues raised. The Government wants to ensure that the regulatory framework is as effective and transparent as possible and for this reason is conducting a thorough review of the framework.

THE DTI ROLE

4. DTI has no direct role in the regulation of GMOs and the environment: this is the responsibility of the Department of the Environment, Transport and the Regions (DETR), together with the Scottish Office, the Welsh Office and the Ministry of Agriculture Fisheries and Food (MAFF).

5. DTI's role in relation to biotechnology principally concerns promoting competitiveness through its development and application by UK industry. The Department's Biotechnology Directorate is responsible for sponsorship of the industrial development and commercialisation of the technology to help UK firms to improve their competitiveness in world markets. The Directorate works within the DTI and with other Government departments on regulatory and other issues affecting the competitiveness of all industries applying biotechnology, including, for example, pharmaceuticals, diagnostics, environment, agrochemical (including fertilisers and pesticides) and agrifood industries.

6. The Directorate is also responsible for issues of particular concern to small and medium sized (SME) biotechnology companies: working with the sector to improve the climate for raising finance; development of networking between companies and finance providers; supporting clusters; enhancing manufacturing capabilities; and supporting the development of incubator and business mentoring services.

7. The Office of Science and Technology, part of the DTI, has an important role in co-ordinating Government policy on biotechnology. As part of this work, OST provides support jointly with the Cabinet Office for the Ministerial Group on Biotechnology, MISC 6, and provides the Secretariat for the Inter-departmental Group on Genetic Modification Technology, IGGMOT which provides a forum within Government for debate of (GM) policy across Government. OST is also leading, jointly with the Cabinet Office, the Review of the Regulatory and Advisory Framework for Biotechnology, which seeks to ensure that Government is receiving the best possible scientific advice on biotechnology. OST is also responsible for aspects of Government's science policy which impinge on GM crops and foods, such as LINK and Foresight (including the Secretariat for the Food Chain Group, and the Agriculture and Horticulture, and Food and Drink Panels). The OST also supports research and post-graduate training in biotechnology and related areas through the Research Councils.

8. The Patent Office is an executive agency of the DTI and deals with the granting of intellectual property rights within the United Kingdom, including biotechnology patents. The Office also co-ordinates government policy on intellectual property. Part of the mission of the Office is to stimulate innovation by the granting of intellectual property rights. However, intellectual property rights are negative rights. That is to say the use of any patented technology always remains subject to other laws such as those controlling research, commercial exploitation and release into the environment.

9. The Committee has requested comments from the Department in two particular areas.

- (i) The levers and opportunities that the Government has to influence the future development of GMOs to take into account both the risks and opportunities that GMOs may present in relation to direct and indirect impact upon the environment.

10. An important component of the DTI's work in promoting competitiveness is support for innovation. Where a project includes development of Genetically Modified Organism or use of a GMO the organisations receiving support must, like any other organisation working with GMOs, comply with relevant UK regulations, for example the Genetically Modified Organisms (Contained Use) Regulations 1992 as amended in 1996 and 1998 and the Genetically Modified Organisms (Deliberate Release) Regulations 1992 as amended in 1995 and 1997, taking account as required of the potential impact on the environment.

- (ii) The scope for UK action [, in the context of the release of GMOs into the environment,] in the relationship between the UK, and EU, approach to GMO regulation and the GATT/World Trade Organisation disciplines and obligations.

11. The joint DETR/MAFF Memorandum to the Inquiry sets out the position in relation to UK initiatives at an EU and international level in relation to regulations concerned with GMO releases to the environment and biosafety. The following paragraphs focus on the World Trade Organisation (WTO) aspect.

WTO Rules in relation to GMOs

12. Trade in GMOs and in the products of GMOs between members of the World Trade Organisation is subject to the general rules of the General Agreement on Tariffs and Trade (GATT). These rules are built on the core principles of non-discrimination (treating all countries equally), national treatment (equal treatment for imported and domestically produced goods) and transparency. The rules prevent the use of import bans, quantitative restrictions and other non-tariff barriers which restrict trade either directly or indirectly.

13. There are, however, some limited exceptions to these general rules which allow governments to take measures to restrict trade. The two most relevant exceptions are:

- (i) exceptions necessary to protect human, animal or plant life or health (GATT Article XX(b));
- (ii) exceptions relating to the conservation of exhaustible natural resources if such measures are made effective in conjunction with restrictions on domestic production or consumption (GATT Article XX(g)).

14. Both of these exceptions are subject to the requirement that such measures are not applied in a manner which would constitute a means of arbitrary or unjustifiable discrimination between countries where the same conditions prevail, or a disguised restriction on international trade.

Human, animal and plant life or health—Article XX(b)

15. Article XX(b) of the GATT is given practical meaning by the WTO Sanitary and Phytosanitary (SPS) agreement. This agreement recognises that WTO Members have the right to take measures necessary for the protection of human, animal or plant life or health, *provided that* such measures are based on scientific principles

and are not maintained without sufficient scientific evidence. In cases where relevant scientific evidence is insufficient, Members may *provisionally* adopt measures on the basis of available information; but they must seek to obtain the additional information necessary for a more objective assessment of risk and review the measure accordingly within a reasonable period of time.

16. In the absence of international standards or guidelines, the WTO compatibility of any decision to introduce trade restrictions in GMOs on health grounds (including measures such as requirements for segregation) would depend on the scientific view taken of the risks to human, animal or plant health arising from the organisms or products. It is for national Governments to decide the desired level of protection or acceptable degree of risk (although this is a highly complex area); but if a risk assessment based on sound science finds that risks arising from current policies are below the desired level of protection, then any further measures would be incompatible with the SPS agreement. EC regulatory procedures are based on sound science, and, therefore, under the SPS agreement no trade restriction should be imposed in respect of any GMO or its products which is approved under these procedures. Ultimately it is for the WTO Dispute Settlement procedures to decide whether a trade restriction is justified under WTO rules by the risk assessment on which it is based.

Conservation of exhaustible natural resources—Article XX(g)

17. Unlike Article XX(b), the exception provided for under Article XX(g) has not been developed into an agreement or further set of rules and the only interpretations of this provision are therefore in the case law of WTO-disputes. The position is therefore considerably less clear cut than for measures taken on health grounds.

18. A useful recent interpretation by the WTO Appellate Body confirmed that “exhaustible natural resources” can include environmental and biological resources such as species if they are threatened with extinction. However, the interpretation went on to say that there must be a demonstrable substantial relationship between the measures taken and the conservation aim and the measure should not be disproportionately wide in its scope and reach.

APPENDIX 19

Memorandum from the Royal Society

GMOs AND THE ENVIRONMENT

INTRODUCTION

The Environmental Audit Committee of the House of Commons initiated an inquiry into genetically modified organisms (GMOs) in March 1999 requesting comments on:

- (a) the potential environmental impact of such crops; and
- (b) the operation of the current regulatory and advisory framework for overseeing developments in biotechnology.

The Royal Society welcomes the opportunity to comment and reiterates its recommendation for an overarching body that could advise on the wider ecological impact of GM crops, amongst other issues.

The Society has already produced statements on genetically modified organisms (*GM Plans for Food Use*, September 1998; *Regulation of biotechnology in the UK*, February 1999) and the scientific advisory system (June 1998). This response to the current inquiry draws on recommendations made in these earlier publications. The response has been endorsed by the Council of the Society, and was prepared by a group chaired by Professor Brian Heap FRS (Foreign Secretary and Vice-President, Royal Society). The other members were Professor Ted Cocking FRS (University of Nottingham), Professor Don Grierson (University of Nottingham), Professor Chris Leaver FRS (Oxford University), Dr Terry Rabbitts FRS (Cambridge University) and Dr Rebecca Bowden (Secretary).

- (a) Concerns regarding the potential environmental impact of GM crops are set out in full in Part 4 of the Society's 1998 statement (*GM plants for food use*). The two main issues are the transfer of the introduced genes to wild plants and non-GM crops, and the indirect effects of the GM crops themselves on the local environment (e.g., effects on non-target insect and weed populations, and the possible development of resistant insects and weeds). The risk of problems arising from gene transfer is believed to be small, and ways to minimise it are presented in Section 3 of the 1998 statement. Indirect environmental consequences require strict monitoring and possible statutory restrictions on GM crops. The possible environmental benefits resulting from reduced use of chemical insecticides and herbicides should not be forgotten.
- (b) With regard to the regulatory and advisory framework, the main areas of concern that the Society recommends be addressed by Government are as follows (see also *Biotechnology regulation in the UK*):

1. Use of an overarching body, to which specialist advisory committees would report, to take a broad overview of developments and concerns related to biotechnology, in particular the wider ecological impact of new developments.
2. Improvement of communication and co-ordination between Government departments involved in the regulatory process.
3. A presumption that scientific advice to Government will be made publicly available unless it is demonstrably against the national interest to do so.

1. *Is there a need to develop a strategy for assessing and managing the environmental implications of the release of GMOs?*

- *Should this strategy include the formal assessment of the environmental benefits for GMOs alongside their risks?*

2. *If so, does the Government have adequate mechanisms for developing such a strategy, in terms of:*

- *the co-ordination of existing policy and regulation;*
- *oversight of, and influence over, the direction of development of GMOs;*
- *the assessment of direct and indirect risks, including the cumulative impact of GMO releases over time;*
- *the contribution that GMOs might make to more sustainable agriculture?*

Although genetic modification and the release of GMOs are tightly regulated in the UK, concerns have been expressed that there is no cross-departmental overarching body to monitor the impact of GMOs on agronomic practices or to look at the cumulative effects of GM crops, since applications are reviewed on a case by case basis. In 1994 the Biotechnology and Biological Sciences Research Council (BBSRC) held a Consensus Conference on plant biotechnology at which a cross-section of lay persons considered the implications of these technologies. We agree with the recommendation of this panel that the regulatory authorities should address the wider issues surrounding the introduction of GM commodity crops by putting in place a monitoring mechanism or overarching organisation (as set out in our recent publications *Genetically Modified Plants for Food Use and Regulation of biotechnology in the UK*).

We welcome recent moves by the Government to establish a Ministerial committee to oversee biotechnology; it is likely that this Committee will provide vital co-ordination of policy across departments. However, it will also be necessary to ensure that there is also some mechanism for taking a broad, well informed, overview of developments and concerns. In addition, there is a need for some mechanisms to obtain authoritative advice at short notice in response to public alarm over particular issues.

The reliance on a case by case approach in obtaining expert advice on GMOs for policy makers may result in a lack of analysis of the overall impact of the technology on agriculture and the environment, and of the long-term effects of GMOs. Whilst it is important that GM crops should not have a greater negative impact on the environment than non-GM crops, it should also be recognised that there may be potential environmental benefits in the use of such crops. Nevertheless, the following points are not adequately covered by the current regulatory and advisory committee system:

- consideration of the potential effects of GM crops in comparison with the effects of current agricultural practices in general on ecosystems and the environment as a whole;
- review of mechanisms by which GM crop plants could be monitored in the environment and recommendations for long-term monitoring of impact on ecosystems;
- review of current guidelines for isolation of certified seed crops and high erucic acid oilseed rape and provision of recommendations regarding isolation of specific GM crops of concern (such as crops modified to produce pharmaceuticals) and possible statutory provisions;
- review of available methods for minimising gene transfer to crops where such transfer may cause concern and recommendations regarding further research;
- consideration of possible positive and negative effects of GM and non-GM insect tolerant crops on the ecosystem and provision of guidelines for growth of such crops and recommendations for further research, as applicable;
- consideration of current guidelines for growth of GM and non-GM herbicide tolerant crops and the potential for statutory measures;
- applications for herbicide use on a crop should be considered in conjunction with applications for release of herbicide tolerant crops. There should also be a mechanism by which the long-term impact of such crops on agricultural practices could be monitored.

We therefore recommend that these issues be covered via extending the remit of the appropriate advisory committees. In addition, an overarching body is needed to have an ongoing role in monitoring the wider issues

associated with the development of biotechnology in agriculture and food production. Such a body should consider those of the above issues that cannot be considered by individual advisory committees for practical reasons, such as wider issues affecting all applications of biotechnology. In addition, the Food Standards Agency and Ministerial Committee on biotechnology will have an overseeing role to play on some aspects of biotechnology. We acknowledge that many of the concerns raised cannot be addressed without the information gained from long-term small-scale field trials and laboratory work, and that research and monitoring must continue once crops are in commercial use.

Regarding the provision of scientific advice on GMOs to policy makers, the current use of a number of specialised advisory committees could be more efficiently co-ordinated if the Chairmen of such committees had an official forum in which to discuss concerns raised by their committees with respect to individual applications. It is also important for such issues to be reported to any overarching body responsible for monitoring developments as a whole. This would be possible if advisory committee Chairmen reported to such a body. It is equally important for the overarching body to have a means of communicating any concerns to the relevant advisory committees so that they may take action. The overarching body will also need to include consumer and environmental representatives, to ensure a suitable breadth of knowledge to monitor wider issues and long term developments. Such a body could then give advice to the Ministerial committee set up to monitor Government policy in biotechnology. If the committee were able to advise on cross-departmental issues then they could co-ordinate both the funding of biotechnology research and the regulation of the end-products of such research.

3. What mechanisms exist, or are needed, for incorporating public values and concerns regarding the environmental implications of GMOs, alongside the results of scientific assessment, within the decision making process?

It is particularly important to take account of public values, and how these are formed, at all stages in any process of setting standards, as was outlined in the report of the Royal Commission on Environmental Pollution, published in 1998. However, in order to take account of such values there must be mechanisms in place to determine them. Biotechnology has many potential applications in human and veterinary medicine, agricultural practice, food quality, nutrition manufacturing and environmental protection. As a result it may also have immense industrial potential. Nevertheless, it is necessary to have adequate regulatory procedures in place to ensure all aspects of the technology are addressed.

We welcome indications that the current Government is seeking to conduct its affairs more openly. We recognise that confidentiality can often be important, but believe that a policy that favours extensive use of confidentiality and the Official Secrets Act, irrespective of need, is unhealthy and counterproductive. We support the approach set out by the Chief Scientific Advisor in "The use of scientific advice in policy making" regarding transparency.

We also welcome moves by the Advisory Committee on Novel Foods and Processes (ACNFP) and the Advisory Committee on Releases to the Environment (ACRE) to increase transparency in the regulatory system by the publication of agenda and minutes, and ACNFP's initiative to convene open meetings. We recommend that other advisory committees involved in the regulation of biotechnology, such as those advising on pesticides, consider such measures.

We also recommend that greater information should be made available on the Internet. Web sites for individual Government departments involved in biotechnology regulation should be linked and should contain sufficient detail on the regulatory process, applications received, advice given to Government by non-departmental public bodies and the data considered during the formation of that advice. It may also be necessary to actively publicise the availability of such information so that interested parties (such as the Media) are able to use it. Mechanisms should be found to minimise the amount of information that needs to remain confidential.

We strongly endorse the recommendation of the Chief Scientific Adviser that there should be a presumption that scientific advice to Government will be made openly available, unless it is demonstrably against the national interest to do so.

The use of GMOs may offer a wide range of benefits and we support ongoing research in this field. However, we recognise that the technology and current regulatory system have aroused concern amongst some consumers, coming at the same time as other, unrelated, concerns about food safety, notably BSE and *E.coli* O157 food poisoning. It is important that such concerns are respected and accurate information is made available to help consumers to make informed choices.

4. What is feasible and desirable in terms of preserving consumer choice by segregation and labelling—particularly the issue of "labelling for process" to provide for consumer influence over the use of GMOs and their environmental implications?

An extensive discussion of problems related to labelling of foods containing GMOs and their derivatives may be found in Annex V of the Society publication *Genetically Modified Plants for Food Use*.

We strongly support the labelling of foods containing GM material, where the new foodstuff is substantially changed (according to specified criteria) from that of its conventional counterpart, to allow customer choice. We

also recognise that in order to carry out labelling, segregation of commodity crops and derivatives through long supply chains on a global scale will be necessary to enable traceability and that this may cause difficulties.

For enforcement purposes, it will be essential to recognise a minimum level for adventitious presence of GM material, below which a product can be considered to be free of GM derivatives (particularly relevant for organic certification). Scientifically validated testing methods would have to be developed and agreed in order for such enforcement to be carried out in a reliable, readily repeatable and practical basis. We recommend that the regulatory authorities, the European Commission and relevant bodies work together to resolve this issue.

Any over-arching body set up to monitor biotechnology should also consider the current regulations and in particular, investigate methods by which information can be disseminated to all members of the supply chain in order for such labelling to be effective. In view of the imprecise nature of the regulations governing labelling, there is also a pressing need for the regulatory authorities to re-evaluate the requirements relating to the labelling of GM foods and ingredients, derived from each of the current statutory requirements and to distil from these general principles which can be applied equitably and uniformly to all current GM crops and to those likely to be approved during the foreseeable future.

5. *What scope does the UK and EU have for policy initiatives, and what are the prospects for multilateral agreement, on the release of GMOs into the environment—with particular reference to the World Trade Organisation and GATT disciplines and obligations?*

The Royal Society supports the move to develop an International Biosafety Protocol as a step towards the co-ordination of international legislation regarding genetically modified organisms. In particular, we recognise the need for the EU to liaise with both the US and the developing nations to co-ordinate the formation of the future policies on GMOs. The UK may have a role in such initiatives by seeking greater liaison with the US on long-term policy initiatives. We have not commented on the interaction of any such legislation with other multi-national agreements since this is a matter for those with legal expertise.

6. *Are there adequate arrangements for civil liability for environmental damage caused by GMOs?*

We have not commented on the issue of liability since this is a matter for those with legal expertise.

Additional information

The Society would like to draw attention to the following Royal Society publications which are of relevance to this subject: *The Scientific Advisory System* (June 1998), *Genetically Modified Plants for Food Use* (September 1998), *Regulation of Biotechnology in the UK* (February 1999) and *Scientific Advice on GM food* (April 1999).

Additional copies of this response and the above publications are available from The Science Advice Section at the Royal Society (rebecca.bowden@royalsoc.ac.uk telephone: 0171 451 2588 fax: 0171 451 2692). All publications are also available on the Society's web page (www.royalsoc.ac.uk).

March 1999

Questions to which witnesses were asked to respond by the Committee

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— Should this strategy include the formal assessment of the environmental benefits of GMOs alongside their risks?

2. If so, does the Government have adequate mechanisms for developing such a strategy, in terms of:

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- the assessment of direct and indirect risks, including the cumulative impact of GMO releases over time;
- the contribution that GMOs might make to more sustainable agriculture?

3. What mechanisms exist, or are needed, for incorporating public values and concerns regarding the environmental implications of GMOs, alongside the results of scientific assessment, within the decision-making process?

4. What is feasible and desirable in terms of preserving consumer choice by segregation and labelling—particularly the issue of “labelling for process” to provide for consumer influence over the use of GMOs and their environmental implications?

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